New York, June 21, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 25

Making Office Furniture Pay Big Dividends

ELSEWHERE in this issue, Robert M. O'Brien, superintendent of rolling stock and shops New Orleans Public Service, Inc., tells how that company in 3½ years has increased the average car mileage per pull-in from 1,380 to 217,728. An interesting statement in this account is that with an idea of building up the morale of the mechanical department, master mechanics at the various carhouses were provided with suitable offices and office equipment. Of course, it is not claimed that this was the reason that the number of pull-ins and the maintenance cost were reduced. But it indicated a line of thought on the part of the management that probably goes a long way toward explaining the remarkable record which the mechanical department has made.

A good man always works better when an appeal is made to his self-respect. Giving the master mechanics better offices and better office furniture did not make them any more capable in a technical sense, but it undoubtedly did give them a new sense of their own importance in the railway organization and stimulated them to do better work than they had ever done before. Many a man has it in him to do good work if properly encouraged. In this case the encouragement took the form of increasing the dignity of the position, and certainly if the results achieved at New Orleans are a fair criterion, this method is worth trying elsewhere.

Using a Technical Man for Technical Work

ANOTHER progressive step that the New Orleans company has taken to improve the quality of railway maintenance work is the employment of young graduate engineers to inspect and test electrical apparatus. The superintendent of rolling stock and shops believes that a man who has made a comprehensive study under competent instructors of the theoretical side of electricity, is better able to make accurate scientific tests, than is the average practical railway man.

For this reason it is planned to have the electrical equipment of the cars thoroughly overhauled after 40,000 miles of operation, and carefully tested by an electrical engineer before it is returned to service. Should the engineer in his work of testing find only one serious defect in equipment that would have caused an accident should it have passed a less rigid inspection, his salary would be earned several times over. Even without this contingency, the reliability of the equipment should eliminate delays and interruptions to service that in themselves cost a great deal of money.

This is in line with the best modern thought on the subject of technical education, which acknowledges that the college graduate, after having a certain amount of practical experience is usually far more valuable in any organization than is the man without technical training. It is, however, a point of view which has been slow to be accepted by electric railway men in general, and the adoption of this plan by New Orleans Public Service, Inc., is the more encouraging on that account.

He Bought Them Because They Were Cheap

A MAN we know has a pile of old hats on the shelf of the hall closet in his home. There are straw hats, felt hats, and derbys; some broken, others out of shape and all rather dilapidated. None of them is much good to him now although in every case he thought himself rather smart when he bought the hat. He bought them because they were cheap.

Afterward, he discovered that while the cheap hat looked well enough at first, it did not last very long. So he got another cheap hat to replace the first cheap hat, and in the end spent a good deal more money than if he had bought a high-grade product in the first place.

A few railways follow a similar policy in buying rolling stock. They purchase second-hand cars and equipment because they are cheap. Later they find out, as did the man with the hats, that cheapness alone is not a sufficient recommendation. Their odd cars differ in appearance and mechanism from the other cars on the property. They give to the property an appearance that we like only to associate with the junk yard. The variation in equipment requires extra investments to provide replacement parts and thereby adds to the overhead expense. Maintenance costs run high and increase rapidly as time goes on. The number of pull-ins and service interruptions are disgraceful. And soon the cars have to be scrapped—much sooner than new cars would have had to be scrapped.

A company which follows this policy, soon accumulates a miscellaneous assortment of rolling stock which clutters up the storage yards and is the only thing it has to show for money spent, for such cars would doubtless earn deficits. Like the old hats of the man already referred to, these cars are of little value. Bought because they were cheap, they gave a poor quality of service and had only a brief useful life. A first-class car bought new would have given more and better service and in the long run would have been a decided economy as well as an attraction to riders.

There are occasions when the purchase of a few second-hand cars will successfully solve a pressing problem. As a regular policy, however, it is almost certain to be a failure. Yet it is nice for the managements who are living in 1924 and not 1904 to have this other type of management in existence, because this provides a means of disposing of the "has beens" in cars.

This is the issue in June that is devoted essentially to maintenance subjects

A New Way of Increasing Rail Life

WITH improvements in track joints the wear of the rail head is becoming more and more a dominant factor in the life of track. Wear depends primarily on the hardness of the rail, and the high carbon steels now used extensively have a longer life in track than the early wrought iron or soft steels. They do have a tendency toward brittleness, and occasionally failures occur due to breaks in the rail.

The ideal rail should have a section of tough metal with a hard wearing surface. While such rails have never been produced commercially, at least in this country, the so-called *in situ* process has been developed for surface hardening. This is now being experimented on by the Toronto Transportation Commission under the direction of A. T. Spencer, assistant to the general manager, as described in this paper for June 14, page 922.

That the process does harden the rail surface is an established fact. It is to be hoped that the results obtained will be in every respect all that are claimed. There are many miles of rail in service that while partially worn, still have sufficient metal in the head to last for several years if the wear can be arrested.

The tests being made by Mr. Spencer indicate that the life of rails can be prolonged perhaps five years by the application of this process. It is quite inexpensive and does not require the track to be disturbed in any way. In fact, the work can be done at night without interruption to car traffic the next day.

With such possibilities before it, the tests of the process being made in Toronto will be watched with great interest by way engineers.

It Pays to Do a Good Job in the First Place

THERE may be some question as to the desirability of building cars to have long life, because merchandising value as well as cost of maintenance must be taken into consideration, but there is no such question about building track to have the longest possible life. It is more expensive to tear up the old track and replace it every few years than it would be to do a real job of construction in the first place. Moreover, tearing up the pavement and relaying the rail involve interruptions to service and inconvenience to the general public. This element, although difficult to evaluate in dollars and cents, should not be overlooked.

Probably the most interesting point developed by the track joint survey which appears elsewhere in this issue is the opinion expressed by a number of way engineers that poor original construction is to blame for the majority of joint failures. Convincing evidence in this direction is furnished by the experience in Atlanta, where it was found that all of the joints made on one rail by a particular construction gang developed defects, while those made at the same time on a parallel rail by a second gang remained in good condition. This incident seems clearly to indicate that the quality of the original workmanship is a vital factor in the life of the joints.

In line with this theory is the idea that repairs should be made by installing the best type of modern joint rather than by replacing the defective joint with another of the same kind as that used in the first place. Most railway companies appear to favor the practice of installing the best joint.

Perhaps the most convincing way of expressing the soundness of a policy of excellence in track construction was outlined recently by a prominent way engineer who remarked, "When I get through with this job I want people to remember how long the track lasts, not how little it cost to build it."

Horse Power— or Brain Power

ALL THE track laborers on one good-sized Eastern railroad, numbering perhaps thousands, develop a working effort of only some 300 hp., according to its president. That is the way he would rate them as machines, figured from the actual work their muscles perform. On this basis man-power is the most expensive kind of power in the world.

Then why continue to employ man-power to do the work of a machine? If the man does the work no better and the cost is more, there is not much argument in favor of the man. The value of man-power comes in direction of effort, so that instead of supplying a large quantity of brute force, a much smaller amount can be applied intelligently to produce the desired result faster. Going a step further, the man need not apply the power at all, but only supply the directive force to control a machine.

But unless the man can think and perform a duty that cannot be done equally well by a machine, he is not fulfilling a real place in the present scheme of things. Even today too many men, not only in the ranks but in more important positions, are supplying little more than horsepower; they let some one else do the thinking for them and merely carry out the designs of others, often not as well as a good machine can do.

Opportunities for doing things better and for rendering real service are missed repeatedly, and as a result not only the men themselves but the properties of which they form a part fail to progress as they should.

Let each of us stop and consider—am I supplying brain-power or only horsepower? Is my work so mechanical that I can be replaced by a machine which can do it better and at less cost?

Maybe It's Not So Bad to Have a Fickle Public

SOME electric railway executives lament the fickleness of the public. Today the majority of people may appear to sympathize with the aims and objects of the railway and be willing to help in their accomplishment, while tomorrow the tide of public opinion may be running strongly against the traction company. We have all seen instances of that kind. Often it has been some vote-seeking politician with more oratory than facts at his command who has inspired sudden change in attitude. Without doubt it is a hardship on a railway to have the support which it needs suddenly withdrawn. But perhaps it is not so bad as it seems. Knowledge of the fickleness of the public should serve to keep the railway management alert and energetic in providing service that is above criticism. In other words, the company must keep its patrons sold on the idea that it is doing its job well. That is the unvarying basis of good public relations.

Track Joint Failures—Cause and Repair

A Survey by the "Journal" Shows that a Number of Way Engineers Blame Failure on Poor Original Construction—Maintenance Methods of 14 Railways Are Described—How Battered Joints Are Built Up by Welding—Granite Block Paving Is Favored

When Making Joint Repairs in Milwaukee the Practice Is to Remove the Paving with Air Tools for a Width of About 12 In. on Each Side of the Rail and for a Length of About 3 Ft. on Each Side of the Joint

THE consensus of opinion among way engineers developed by a survey made by ELECTRIC RAILWAY JOURNAL is that failure of track joints can usually be attributed to poor original construction. A variety of methods are used to determine whether or not a joint should be opened up for repairs. In making repairs most railways appear to favor the use of the best type modern joint rather than the installation of a joint of the same kind as the original. For paving along the rail granite blocks are thought by a majority of these engineers to be the most satisfactory material.

Concerning the causes of joint failure in Baltimore, W. W. Wysor, chief engineer United Railways & Electric Company, says: "In bolted joints the most frequent cause of failure is improper fit of the joint and failure to keep it tight. Failure may also be due to improper design of the joint plate, but assuming that plates have sufficient strength and are designed with proper bearing area, both top and bottom, the failure is then probably due to improper fit or improper tightening of the joint in the first place or failure to hold it tight.

"When it comes to welded joints, it would be very difficult to say what is the most frequent cause of failure. That would, of course, depend upon the type of welded joint used and the particular methods employed in making the welds. But one thing in my opinion which is essential to the success of all joints in paved streets, whether they be bolted or welded, is the elimination so far as possible of any space between the ends of the rails and that the head of the rail throughout the joint should be continuous, of uniform section and uniform metal. If some form of welding is employed where the heads of the rails are actually melted together, care should be taken not to change the chemical or metallurgical properties of the steel, and the proper contour of the rail, if disturbed, should be restored. Where the rail heads are not melted together, but merely abutted, precautions should be taken to make joints just as tight as possible. The heads of the rails should be milled to a smooth true surface and the rails should be drawn together in the field by the use of drift bolts or by some form of compression machine."

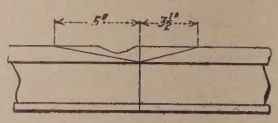
Carelessness in making the joint, in the opinion of C. A. Smith, superintendent of roadway Georgia Railway & Power Company, Atlanta, Ga., is responsible for most failures. Instances have occurred in Atlanta where both the left-hand rails of a double-track line have broken down at the joints, while both the right-hand rails remained in good condition. Investigation showed that the same construction gang had made the joints on both of the good rails and a different gang had made the joints that had failed.

The most frequent cause of joint failure, according to B. H. Eaton, engineer maintenance of way Los Angeles Railway, is loosening of the plates, causing the receiving rail to cup. As this cup grows deeper it entirely destroys the joint either by breaking the plate or the rail. Another frequent cause of joint failure is loose track, allowing too severe bending moments to occur under wheel loads.

The Los Angeles Railway has found that joint failures are far more frequent in the so-called rigid type of construction than in more resilient types. This is thought to result from crystallization of the rail,

caused by the pounding of the car wheel, rather than from loose track or cupping. Very serious trouble has been experienced on all the rigid tracks of this company.

The Chicago & Joliet Electric Railway has found the most frequent cause of joint failure to be poor original workmanship. It has been the experience of this company that a joint which is not properly supported will fail under a very small amount of traffic.

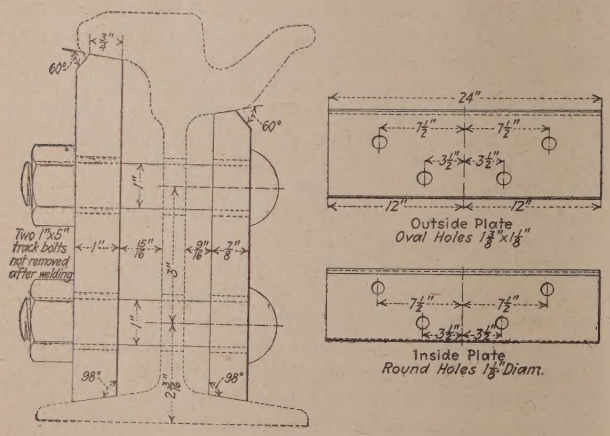


The Union Street Railway, New Bedford, Mass., Cuts Back on Both the Damaged and the Good Rail Before Building Up a Battered Joint.

A similar opinion is expressed by A. T. Spencer, assistant to the general manager, and formerly way engineer, Toronto Transportation Commission. Mr. Spencer says: "On mechanical joints under continuous service there occurs in many places cupping of the receiving rail. Should the joint be poorly supported there will develop a rail movement at the joint. This causes wear on the fishing surfaces of the plates and rail, which in turn causes the joint to deteriorate more rapidly. Defects in welded joints in our experience have almost invariably been traced to poor quality of welding workmanship or possibly a break in the rail outside of the joint plate."

From experience in Milwaukee, it is believed by R. H. Pinkley, engineer way and structures the Milwaukee Electric Railway & Light Company, that joint failures in general are due to imperfections in the joint itself. It is pointed out, however, that there are cases where other causes contribute to such failure. The most common of these are failures of the foundation due to poor subsoil or undermining of the track.

Improper fitting of the rail ends or joint connection or bad bonding are blamed by S. Clay Baker, engineer



Seam-Welded Joints Used by the Chicago Surface Lines. Bolts Are Left in Place and Spot Welded

maintenance of way East St. Louis & Suburban Railway, for joint failure. In the case of bolted joints, loose bolts are sometimes responsible for failures.

Most of the track built in Chicago since 1907 under the specifications of the Board of Supervising Engineers has been 9-in. 129-lb. girder rail on concrete or crushed stone foundation, using Lorain electric welded joints. Concrete has been used extensively for paving foundations in various types of construction.

Electric welded joints are specified as standard construction except at special work and the process has proved satisfactory and economical under existing conditions wherever traffic can be rerouted, handled on temporary tracks or the construction carried out on one track at a time with traffic using the other. Most of this work has been performed on a contract basis under the terms of which the life of the joint was guaranteed and the railway paid a fixed price per joint.

During the general construction program subsequent to 1907 a complete record of all track joints was made, identifying them by house numbers along the streets. As repairs have become necessary these records have been maintained, so that an almost complete history of all the joints on the system is now available. This furnishes a good basis for analysis of the merits of various types of construction and repair methods.

Such an analysis made for a group of 176,000 joints put in by the Lorain welding process during the original construction period showed a failure of slightly less than 1 per cent per year for the first 10 years of the life of the new track. This analysis was made for track under heavy traffic. On light traffic streets the percentage of joint failures over a period of 15 years showed even better results.

Determination of Need for Repairs

Personal observation by an experienced track man is the method most widely followed to determine when a joint should be opened up for repairs. Among the railways using this procedure are the Boston Elevated Railway, Twin City Rapid Transit Company, Memphis Street Railway and the United Railways & Electric Company of Baltimore. In Baltimore, however, repairs are often made following the complaint of some individual or organization or at the request of the municipal authorities before the repairs are really necessary in the judgment of the railway.

In the case of an old-time structure which will require reconditioning within a year or two, the Los Angeles Railway does not pay as much attention to poor joints as is paid in the case of comparatively new structures where it is expected to get 10 or 12 years more life. In an old structure this company considers that a joint should be repaired when it is entirely broken and will cause damage to the rolling stock or be dangerous to operation. In a comparatively new structure any joint showing signs of cupping or becoming loose is opened up for repairs. Not only the actual joint which has failed is opened up but also the joint opposite. Track joints are placed opposite in Los Angeles instead of being staggered. Ties are tamped up. New plates are then installed and seam welded.

In Atlanta also the character of the pavement is an important consideration in determining the time to open up a joint for repairs. With an expensive pavement this is done as soon as cupping of the rail is noticed. In Memphis if the rail is so badly cupped that it cannot be ground smooth the joint is opened up. The Chicago & Joliet Electric Railway, on account of limited funds available for maintenance work, opens up joints for repair only after they have commenced to pound or have given other indications that something is loose or broken. Mechanical joints are occasionally opened up and repaired when they become defective electrically.

The practice in Milwaukee is to keep joints in such condition as to avoid complaints due to rough riding or pounding. Whenever joints are in a condition to cause damage to the surrounding track or paving structure they are repaired. In the opinion of Mr. Pinkley the chief factor which affects the degree to which such

maintenance can be extended is the ratio of earnings to operating expense.

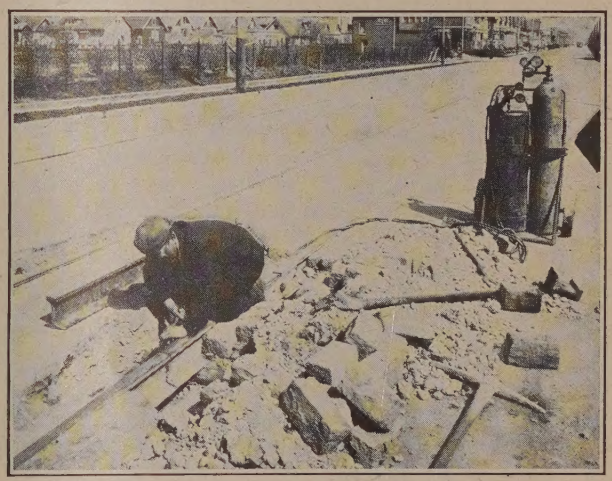
In Toronto a cupped receiving rail is given early attention. Otherwise the rapidly increasing depression might require the installation of offset joint plates and the joint would have to be opened up anyhow to accomplish this. It is felt therefore that it is not worth while to postpone needed repairs. Sometimes wave motion of the rail at the joint necessitates the opening up. Movement of the rail ends is used also by the East St. Louis & Suburban Railway as an indication of the need for joint repairs.

On the Chicago Surface Lines both the division maintenance forces and the track switch cleaning and maintenance men make observations of the condition of rail joints in their divisions. Any defects which require immediate attention are reported by telephone as soon as possible and emergency repairs are made to relieve the condition until a permanent repair job can be done. In the spring all the track on the system is inspected by trackwalkers sent out by headquarters and tabulations are prepared by sheets showing the condition of joints on each line. These records are used in planning the spring and summer repair program.

There is considerable diversity in the sizes of the areas of paving removed in making repairs. In the case of repairing a single joint in Baltimore paving is removed by pick or crowbar for a distance of 10 in. to 15 in. each side of the rail and for whatever length may be necessary. In other words, no more paving than is absolutely necessary is removed. Sometimes it may be necessary to do some surfacing beyond the joint, and for this reason a slightly larger area of paving may have to be removed. In Minneapolis most of the paving in the track area is of granite block. Outside of the track it may be wood block, brick or asphalt. Granite block paving is removed by workmen with sledges and bars. Wood block or brick paving is removed with picks. The area opened up is approximately 18 in. wide on each side of the rail and extends a foot beyond the cut.

Concerning pavement removal in Toronto, Mr. Spencer says: "If the pavement is a unit one and only one or more joints need attention the blocks are removed by hand labor, using bars and picks. Should a series of joints in the same locality require attention, it may be economy to send an air compressor outfit with chisels and drills to do the job. In the case of an asphalt or other homogeneous pavement it may be economy to use air equipment for even a small number of joints. If a joint requires to be opened up for attention to the plates only, the area opened is about 4 ft. long and 12 in. wide inside and outside of the rail, or just room enough to remove the old and install the new plates. If the rail is loose for a distance either side of the joints a larger area would be opened."

Pneumatic tools are used by the Milwaukee Electric Railway & Light Company to remove paving for a width of 12 in. on each side of the rail and for about 3 ft. on each side of the joint. In Los Angeles paving is removed by hand on small jobs and by compressed air drills on larger ones. The area opened up is about 2½ ft. long and 2 ft. wide, 1 ft. on each side of the rail. All paving along the tracks of the Chicago & Joliet Electric Railway is brick and it is removed with picks and shovels. No more paving is removed than is absolutely necessary to make the repairs. In Memphis, also, paving removal is done by hand. It is interesting to note that in New Orleans the nuts on track bolts are inside the rail and can be reached without disturbing the outside pavement. A description of the track construction methods of this company was published in ELECTRIC RAILWAY JOURNAL, May 17, 1924.



At Left, a 4-Ft. Dutchman Is Ordinarily Used by the Milwaukee Electric Railway & Light Company. At Right, in Cutting Out a Section of Rail the Head Is Sawed with a Hacksaw and the Web and Base Are Cut with an Acetylene Torch

The Boston Elevated Railway uses pneumatic tools and a portable air compressor for paving removal whenever the construction is of concrete or granite block with grouted joints. An area about 4 ft. long and 18 in. wide on each side of the rail is opened up. In East St. Louis it is sometimes necessary to open up a sufficiently large area to raise the ties and retamp them. In other cases extra plates are used on top of the existing tie plates to bring the rail to the proper surface and a smaller opening suffices.

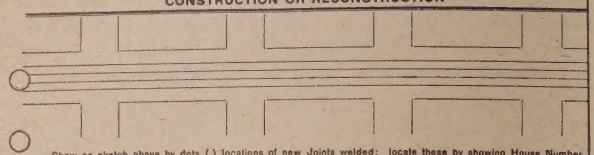
A majority of way engineers from whom information was obtained on the subject of joint repair appear to favor a policy of installing the best possible type of joint rather than installing again the same kind that was originally used. In this connection Mr. Wysor says: "All of our joints in paved streets are, or have been at some time, welded, excepting joints through special work, or where a joint failure has occurred in old track and we have not considered it worth while to reweld. At present all of our joint welding is either thermit or arc seam weld. If failure occurs in

C.S.L. 8072

CHICAGO SURFACE LINES
DEPARTMENT OF TRACK AND ROADWAY
DAILY REPORT OF ELECTRIC WELDING

LOCATION ..... STREET / AVENUE
FROM ..... TO .....
DATE ..... 19...
COMPANY .....
ACCOUNT NO. .....
EQUIPMENT NO. .....

CONSTRUCTION OR RECONSTRUCTION



Show on sketch above by dots (.) locations of new Joints welded; locate these by showing House Number opposite each Joint; or tie in to nearest Cross Street. Show Bonds welded by line across track in proper location. Show new broken Joints welded by Red Dots (.) and locate. Show North Point and Street Names.

RAIL SEC. .....
TYPE .....

Total New Joints welded .....
Total New Broken Joints welded .....
Total New Bonds welded .....
Total Special Work Bonds welded .....
(see attached sketch)

New Joints Are Located by Sketch on the Daily Electric Welding Report of the Chicago Surface Lines

joints of this type they are repaired with the same kind of construction. But if failure occurs in one of the older forms of welding, such as cast welding or bar welding, the repair is made by putting in either one or the other of our present forms.

"When old track which is built of light rail sections and which has reached the point where it will be necessary entirely to reconstruct it within a short time we do not attempt to reweld the joints that have failed. It would be extremely difficult to make a satisfactory weld on old and badly corroded rail of light section and we do not believe the expense would be justifiable. We therefore cut out the broken or otherwise defective joint and insert a piece of rail of the same section and one that is worn to approximately the same extent and install a bolted joint which gives satisfactory service until such time as the track is reconstructed."

In Minneapolis the practice for the last five or six years has been to repair joints by cutting out a section of the original rail and adding a splice which is held in place by four bolts and a seam weld. On the Milwaukee Electric Railway & Light Company's lines the thermit process is generally used in making new joints, although some of the old joints are of different type. When making this kind of weld on short sections of rail it is the practice to make one weld at a time, allowing the rail to cool completely before the second weld is made. At Toronto it is customary, when the condition of the rest of the rail warrants it, to replace a mechanical joint with a welded joint. In cases which require only the tightening up of the bolts the joint is not welded.

The Georgia Railway & Power Company now ordinarily installs welded joints irrespective of the original construction. Although joints were in the past replaced by new joints of the same type on the Chicago & Joliet Electric Railway, all joints are now made by welding. On the other hand the Boston Elevated Railway, the Memphis Street Railway and the East St. Louis & Suburban Railway replace joints with construction identical with the original. The Los Angeles Railway repairs joints with construction of the same type except in the case of cast welds or thermit welds, which are replaced by seam-welded joints.

On small reconstruction jobs, particularly in making repairs to broken standard joints, the Chicago Surface Lines uses seam-welding equipment on account of its low investment cost and flexibility in handling. For repair work where joints are scattered this equipment can be shifted readily from point to point along the right of way. Except in the congested districts a large part of this work can be done during the daytime without delay to car traffic. As the same equipment is used for making repairs to damaged rail ends it allows such work as cutting in new sections of rail and building up tops of the joints to be carried out with a minimum amount of shifting of equipment and delay in completion of the job.

In South Chicago much of the track construction has a concrete paving foundation on top of rock ballast. Joints in this track were originally of the cast weld type. Tee rail was used and when a bad joint was encountered it was the practice for a time to cut out the old cast weld and splice in a piece of rail approximately 18 in. long, welded on by the contact process. A 4-ft. bar on either side was held in place by four welds.

This type of repair has the advantage of giving a continuous single bar contact between the rail ends. It was, however, very expensive for this class of track and since the adoption of the seam-welding process the latter has been used with good results. Where the cast weld is intact but a piece of the head breaks out near the joint it has been found practicable as a temporary measure to weld in a new piece of rail head by the seam process, thus requiring only a minimum amount of paving to be removed and allowing the old cast weld to remain in place. In some cases worn sections of rail heads are built up with the welder to give additional life.

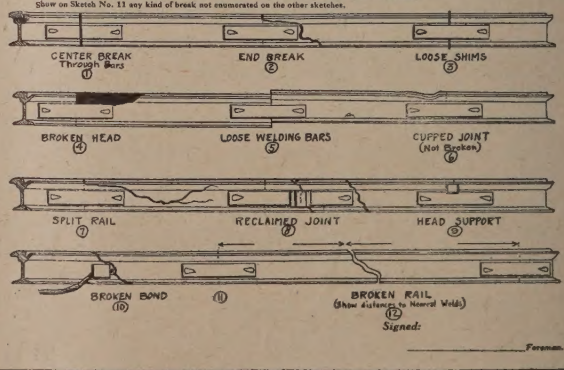
Most railways follow the practice of building up damaged rail ends by welding and then grinding the surface smooth. In Atlanta it is customary to build up by welding in case the rail is cupped to a depth greater than ¼ in. If the cup is less than ¼ in. deep

C.S.L. 8076

CHICAGO SURFACE LINES
DEPARTMENT OF TRACK AND ROADWAY
REPORT OF BROKEN WELDS

Date of Report .....
Division ..... Section Number .....
Location of Break ..... Street or Avenue .....
House Number (or other Location)
Which Track? ..... Which Rail? .....
Kind of Rail ..... Type of construction .....
Kind of Weld .....
Paving in Track ..... Paving in street outside Track .....
Were any Tie Rod or other Holes in Rail at Break? .....
How was Break repaired? .....
If a former welded cut-in Piece; Which weld broke? .....
If a new cut-in was made; How many welds were removed? .....
Give date or number on weld or welds removed .....
" " " " " broken weld not removed .....
Length of new cut-in piece, when made .....
If accident or delay to cars was caused by break, state circumstances .....

From the sketches below, encircle the one which shows the kind of break:
Show on Sketch No. 11 any kind of break not enumerated on the other sketches.

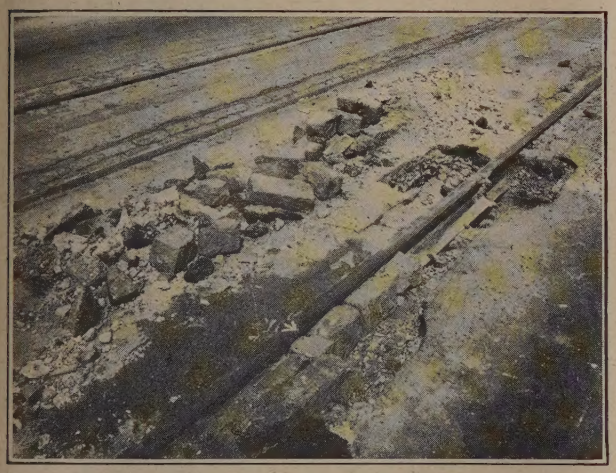


Signed: .....
Foreman

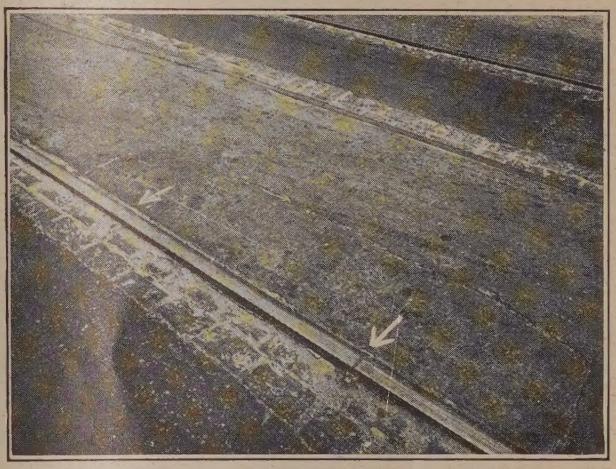
An Additional Report Is Made of Each Broken Loraine Joint Repaired, Giving Full Information Regarding the Break and Showing by Sketches Its Exact Nature

the joint simply is made smooth by grinding. The Memphis Street Railway and the East St. Louis & Suburban Railway build up battered joints by welding. This is done also in Baltimore if the joint is otherwise in good condition. Welding and grinding are done in Toronto, although in some cases it has been found possible to use offset plates and then grind down the rail without the introduction of any welding material. The Twin City Rapid Transit Company follows the practice of cutting off the ends of damaged rails. Welding and grinding are done only in the case of a slight cupping. The Boston Elevated Railway builds up by electric arc welding when the rail ends are only slightly battered.

If the rail is simply cupped and the fishing surfaces are in fair condition the Los Angeles Railway makes repairs to the ball of the rail by metallic arc welding process. If the rail is broken either in the ball or, as frequently occurs, in the web, a section of rail is replaced with a "dutchman." This procedure is practically identical with that followed by the Chicago & Joliet Electric Railway.



When Making Thermit Weld Joints on Short Sections of Rail It Is the Practice in Milwaukee to Make Only One Weld at a Time, Allowing the Rail to Cool Completely Before the Second Weld Is Made



Granite Blocks Along the Rail and Reinforced Paving Elsewhere Have Given Good Results in Milwaukee. The Completed Repair with These Materials Shows a Neat and Workmanlike Appearance

An interesting method of repairing damaged rail ends has been adopted by the Union Street Railway, New Bedford, Mass. A diagonal cut 5 in. long is made in the cupped rail with an acceptable torch, as illustrated on page 960. A similar diagonal cut 3½ in. long is made on the sound rail. The object of cutting back on the good rail is to give the new welding metal a bearing and eliminate any possible drop at the joint. After the cuts have been made the surfaces are thoroughly cleaned. Then the weld is started at the bottom of the gap and continued until the gap is half filled. The process is interrupted at that time because of the possibility of the new welding metal burning if too large an area is filled in at once. If that occurred the joint would be likely soon to fail. The weld is begun and ended at the gage line of the rail because there is more metal to expand and contract there. After the cuts have been filled in by welding the surface of the rail is ground smooth.

Almost all railways use "dutchmen" under certain circumstances, but there are wide variations in practice as to the length of the piece inserted and the circumstances under which it is done. Moreover, way engineers differ as to nomenclature. Some call such a piece "an insert" and say that they do not use "dutchmen" at all.

The practice of the Toronto Transportation Commission is to use "dutchmen" from 4 in. to 12 in. long. This is done, however, only when the rail is broken or parted from the web. Various methods of repairing the joint in this way have been tried. Perhaps the most satisfactory, in the opinion of Mr. Spencer, has been with the use of a special pair of welding plates 36 in. long with bolts passing through both sections of the old rail and the "dutchman" also. The railway, however, does not contend that this method of repairing a joint has been altogether successful.

According to H. M. Steward, superintendent of maintenance, the Boston Elevated Railway uses an insert when the cupping is too serious to be repaired by welding. When the gap between the rail ends is too wide to permit the use of inserts a "dutchman" 12 in. long is used. On the other hand the Milwaukee Electric Railway & Light Company never uses a "dutchman" of shorter length than 4 ft. The Georgia Railway & Power Company uses "dutchmen" varying in length from 10 in. to 20 in. Joint plates 52 in. long are used in this work. The minimum length of a "dutchman" used by the Los Angeles Railway is 5 ft.

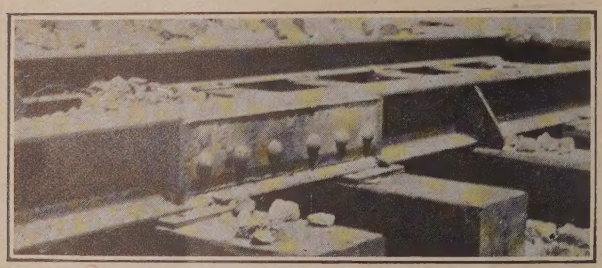
The only place where the United Railways & Electric Company of Baltimore uses "dutchmen" is in closing up a piece of new work. Mr. Wysor says: "We attempt to avoid the use of 'dutchmen' just as much as possible, and in fact they are very seldom used. But occasionally after closing rails have been cut there is a drop in temperature which makes it necessary to install a 'dutchman,' or wait until the rails expand enough to close the opening, or to cut in new rails. We can generally overcome the trouble by waiting for a change in temperature to expand the rails, but sometimes this is not possible and we then resort to a 'dutchman,' which may be anywhere from ¼ to 1 in. in thickness. This is arc welded in place."

It is the practice of the Twin City Rapid Transit Company to install "dutchmen" where broken and battered sections of the rail at the joint are so short that cutting out 18 in. of rail will remove the defect. In such a case a piece of rail of the proper length is inserted and splice plates 34 in. long are bolted and seam welded in place. In Memphis "dutchmen" are

used in two ways. They may be either short pieces only 2 in. or 3 in. long or pieces longer than 6 ft. In the former case a single joint is made and in the latter case two separate joints. The East St. Louis & Suburban Railway uses "dutchmen" only in the case of temporary repairs. When it is necessary to cut in a piece of new rail the joints are placed approximately 15 ft. apart and the piece inserted and it therefore can hardly be classed as a "dutchman."

Where the paving is good along the rail and the track has the proper gage the Chicago & Joliet Electric Railway inserts a short "dutchman" and welds it in place. If the rail is in bad condition and it is planned to replace it in the near future, a "dutchman" about 9 in. long may be used with holes through the piece to be inserted and continuous joint plates. Ordinarily "dutchmen" 4 in. long are used by the Milwaukee Electric Railway & Light Company.

In Chicago in addition to the method of splicing in a piece of rail about 18 in. long, as already described, it is a practice where the weld is loose and the rail ends are damaged to insert a new section of rail 12 ft. in length and to seam weld each of the new joints. In many cases where the rail is badly worn it was formerly



In New Orleans Track Bolt Nuts Are on Inside of Rail, Where They Can Be Reached Without Disturbing the Outside Pavement

the practice to weld in short blocks above the joint bars, making a chock to support the head and lip of the rail. This practice has now been abandoned in favor of using 12-ft. sections of new rail. In the use of the seam welding bolts are left in place.

Often it is necessary to do more to improve the condition of a rail joint than simply to build it up by welding and then grind the surface smooth. In this connection the Chicago & Joliet Electric Railway says: "If the rail ends are bent down they are straightened up with a special device which we have for this purpose and a reinforcing plate is put under the base of the rail. The battered ends of the rail are then built up with an electric welder and ground off to a smooth surface. Generally if any other portions of the rail are out of surface they are raised by means of steel shims on the ties, or if more than 1 in. out of alignment they are raised and supported on wooden blocks." A device of this kind used by the Springfield Street Railway, Springfield, Mass., was described in ELECTRIC RAILWAY JOURNAL for March 29, 1924.

Steel or wood shims are used also by the Toronto Transportation Commission. The Twin City Rapid Transit Company, the Georgia Railway & Power Company and the United Railways & Electric Company of Baltimore all follow similar practices. It is the practice of the last-named railway if the rail is only slightly out of surface above only a few ties to bring it back to grade by inserting steel shims or tie plates between the rail and the tie. If, however, the track is very much out of surface and is in that condition for a long distance a larger area of paving is removed and the tracks reballasted. This is frequently necessary over openings made in the streets for sewers, water pipes or other purposes and where trenches were not properly back filled.

In Los Angeles if the rail joint is simply loose and the rail has not been damaged beyond slight cupping it is the practice to install new plates and seam welds. Any small gaps between the rail ends are plugged with a thin shim of the same section as the ball of the rail. If the surface of the rail at the joint is low a portion of the adjacent track is dug out, the ties are raised sufficiently to bring the track to grade and thoroughly tamped.

In Chicago very few cases have been found where the track is in a condition requiring the grade to be restored. This occurs only where adjacent building construction has caused a settling of the track foundation. Otherwise the foundation is usually found to be in good condition. In the few cases where the foundation has given way, a large scale reconstruction program usually has been necessary, and consequently joint repair work was not attempted. When the rail has become worn so that grade variations occur from this cause, steel shims cut and drilled to correspond with the tie plates are sometimes used. This practice is not strongly favored, however, and is used only when absolutely necessary. Where a break occurs in the rail head cars are kept running by means of temporary jumpers until permanent repairs can be made. These are cast-steel devices of special design and are so arranged that they simply drop in place over the joint plates.

GRANITE BLOCK PAVING IS POPULAR

Among the companies favoring granite block pavement along the rail are the United Railways & Electric Company of Baltimore, Georgia Railway & Power Company, Boston Elevated Railway, Toronto Transportation Commission, Twin City Rapid Transit Company, East St. Louis & Suburban Railway, Milwaukee Electric Railway & Light Company and Chicago Surface Lines.

This paving has been used for some time in Chicago both between the rails and also for the track zone outside the rails. It is considered the only practical type of paving where heavy vehicular traffic is encountered. In outlying districts where traffic is lighter brick paving has given satisfactory results. Some railways favor the use of grout between the blocks, while others prefer a bituminous filler. In the former category are the Toronto Transportation Commission, the Milwaukee Electric Railway & Light Company and the Boston Elevated. At the present time the East St. Louis & Suburban Railway is laying granite block pavement with a bitulithic filler. The idea in this is that it relieves the noise and vibration to some extent and also makes the paving structure more nearly waterproof. The Georgia Railway & Power Company and the New Orleans Public Service are other railways which favor a mastic filler between the granite blocks.

A few railways prefer an entirely different sort of pavement. The experience of the Memphis Street Railway with an asphalt pavement on a concrete foundation has been very satisfactory. The Chicago & Joliet Electric Railway has found brick paving to be satisfactory and economical. Mr. Eaton says: "We have adopted (in Los Angeles) as our standard paving a 6-in. cement concrete base with a 2-in. asphalt top, as we believe it to be the best for use in this locality. It permanently seals the structure and will not allow

water to seep between the paving and the rail. We have a number of miles of this construction which was installed some 10 or 12 years and shows no signs of cracking along the rails, and when necessary to open up for installation of special work, etc., we have found the rails to be in as perfect condition as when it was originally installed, showing no signs of rusting or electrolysis. The cost of repairing this class of paving is probably somewhat greater than that of asphalt concrete paving because it is harder to remove."

The Los Angeles company is so well satisfied with paving of the character described in the preceding paragraph that all paving repairs along the tracks are made in this way regardless of the original construction. When joint repairs are made by the Milwaukee Electric Railway & Light Company the original granite blocks are put back along the rails and new concrete is put in to fill the holes. An accompanying illustration shows the finished appearance of a completed joint repair job. Reinforced concrete with granite blocks along the rail is now considered the most desirable form of paving for Milwaukee, both from the standpoint of cost and wear and also ease in making repairs.

The Chicago & Joliet Electric Railway has found that the original paving bricks are usually in fairly good condition and the unbroken ones can be turned over and reused. After repairs are made and the rail is tight the hole is filled in with a rich concrete mix ture up to the paving subgrade and then brick paving is installed. It has been the experience of this company that about 60 per cent of the paving bricks can be salvaged and used the second time. The Twin City Rapid Transit Company and the Boston Elevated are other railways which reuse the original material so far as possible.

In Toronto, if the paving is a unit one, the old blocks are usually replaced. The paving base, of course, is not taken out, but new concrete is tamped under the base of the rail and brought to the former level. An asphalt surface on a concrete base is often used. In East St. Louis the original paving blocks are put back, but a bitulithic filler is used instead of cement grout, to allow traffic to pass over the repair more quickly.

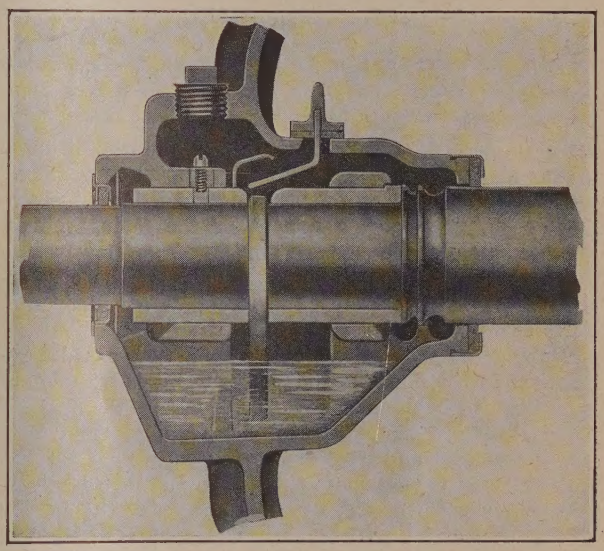
In Baltimore if the original paving consists of some kind of blocks such as brick, wood or granite and is in good condition the same blocks are put back. Generally speaking, however, wood block is so broken or split that it cannot be put back and new material must be substituted. If the old bricks are badly worn they are discarded and new ones substituted, the same being true of granite and other forms of blocks. Where asphalt is laid it is, of course, necessary to put in new material. Ordinarily, after the track repairs are completed, the concrete paving base is installed and the old block laid in place temporarily until the concrete base has had sufficient opportunity to harden. The wearing surface is then restored in a permanent manner similar to the original construction.

Granite block paving is used throughout almost the entire track area in Chicago, and the original blocks are replaced after joint repairs except when they are broken. The granite blocks are always laid with cement grout and on this account a certain number of them are sure to be broken during the removal. In Atlanta the same type paving is ordinarily put back after the railway has made a joint repair. However, asphalt is sometimes substituted for wood blocks, which have not always proved entirely satisfactory as paving along the tracks.

Leakproof Sleeve Bearing Developed

A NEW TYPE of sleeve bearing for electric motors, designed to prevent the leakage of oil into the windings or the entrance of dust and grit into the bearing, has been developed by the Westinghouse Electric & Manufacturing Company. This new bearing is directly applicable to motors for railway shops and, no doubt, will result in improvements in the bearings for motors of rolling stock.

A connecting passage in the upper part of the bearing housing secures a condition of balanced air pressure in the separate chambers into which the housing is divided by the bearing supports. The action of the blower at high speeds sets up a vacuum next to the inside end of the housing and, since it is impossible to seal the housing absolutely at that point because the shaft passes out there, the vacuum is communicated to the space within the housing itself. If the upper passage were not provided, an unbalanced air pressure would result whenever the oil level rose high enough to close the lower cored openings.



This Bearing Is Sealed Against the Entrance of Air or Dust and Prevents the Leakage of Oil or Oily Vapor Into the Motor

For inspection of the oil ring, a large air-tight threaded pipe plug is provided. An inclosed combination filling and overflow opening is placed in the side of the bearing and a rigid cast-iron cover is bolted over the oil-ring slot and made airtight by an oilproof packing.

Where the shaft passes through the bearing, an improved method of supporting the felt dust-proofing washer is used. For the purpose of lending resilience to the soft felt, the metal cap has a diameter at least ¼ in. larger than the shaft diameter. This prevents the felt from being compressed close to the shaft, which would cause it to become glazed and hardened and soon to burn and wear out.

The airtight construction of the bearing prevents the passage of air through the bearing and at the same time prevents oil from being drawn into the motor windings. The oil ring, carrying oil from the oil well to the motor shaft, stirs up and churns the oil into a fine spray, which, in the ordinary type of bearing, is sucked into the motor and covers the windings.

The bearing requires practically no attention, and oiling once or tice a year is all that is necessary.

"Anything Is Possible When We Have to Do It"*

The Working of Economic Laws, the Superior Efficiency in Use of the Street, Intelligent Sales Effort and Good Use of Publicity Will Bring Electric Railways Back Into Their Own

By H. G. Taylor
President National Association of Public Utility Commissioners, Member Nebraska State Railway Commission

IT IS NOT for me to point the way to prosperity for the street railway industry. Street railway transportation will respond ultimately to the unerring influence of economic law. Unfortunately, there have been too many theories about the operation of street railroads. They have been made laboratory specimens for every political tinkerer who could win his way into a place of authority. These transportation "specialists" have been in accord only on one thing—and the ill-fated Akron slogan well epitomizes it—"a nickel or nothing." Blissfully unconscious of changing conditions, increasing costs and the development of the motor vehicle, these human dodoes have maintained an unwavering faith in the power of municipal fiat. If the city ordinance is made to say that street cars can operate for 5 cents, that solves the problem.

During the past 10 years this country has had a rebaptism in the doctrine that government is omnipotent and that such things as wages, fuel, prices, maintenance, business management and other unpleasant facts are immaterial and irrelevant. Indeed, we are assured quite stridently that these things are mentioned only to postpone the dawn of a new day and delay the coming of the industrial millennium. Old King Canute had much the same idea. He marched down to the seashore one sunny morning, followed by the retinue of his court and a number of his subjects, to give a demonstration of his power as a monarch. When the stage was all set, he made a magnificent gesture of authority and commanded the waves to recede.

Economic Law Must Govern

It has been said that it is given unto every man once to make a consummate ass of himself. King Canute measured up to the full limits of his opportunity. The only excuse history has for remembering him is that he made such a fool of himself. At that, however, he displayed more wisdom than some of his modern imitators, for when he returned to the palace he sorrowfully admonished his subjects to take note of the spectacle he had made of himself and never thereafter attempted to interfere with the laws of nature. The Akron, Saginaw, Des Moines, Seattle, Detroit and numerous other street railway debacles furnish emphatic evidence that political demagogues are slower to learn than King Canute. And since thinking has gone out of fashion within the halls of Congress our national legislators have manifested the same brand of stupidity. If anything is wrong, pass a law. Pass a law whether anything is wrong or not. Let the statutes command the sun to stand still and the waves to recede and the rivers to run up hill. Compared with some of the proposals put forth by our uplifters and lawmakers Canute's command was a sage and sensible suggestion.

But I started out to say that the street railway problem will yield ultimately to the action of economic forces. There is a place for the street car. For the moment we do not know just where that place is or how large it is to be, but as the use of the automobile is rapidly reaching the point of saturation the relative importance of the street car is more easily measured.

Motor Vehicles Have Limitations

There are 15,000,000 motor vehicles in the United States. In the classic language of Grover Cleveland, that is a "condition and not a theory." Some one has figured out that if all these motor vehicles were placed in a column 15 abreast the line would extend from New York to San Francisco. Assuming an average value of $750 for each vehicle, the total aggregates the staggering sum of $11,250,000,000. The development of the automobile is one of the amazing phenomena of American life. The automobile is here to stay. It has become a permanent factor in the commercial and social life of the country. It is a recognized unit in the transportation situation. The problem, therefore, for the older established forms of transportation like the railroad and the street railway is to study the problem as it is changed by the new competition.

Already it is becoming apparent that the rosy prophecies of the motor vehicle manufacturers will not all be realized. The prediction that old Dobbin would have to go is now being qualified. A use for the horse still exists. For short-haul deliveries in congested areas he can be utilized to better advantage than the auto truck. And the tractor is not to supplant him on the farm. General utility at lower cost justified his continued use in that capacity. Buses for long-haul transportation have not as yet justified themselves, although there are hundreds of hardy and hopeful souls who are willing to continue the experiments. They are not succeeding notwithstanding public concessions as to free use of highways, exemption from taxation and freedom from regulation of rates and service. Once the novelty has worn off and the public settles down to accept them as ordinary common carriers their problem will be all the more difficult. If they cannot succeed under present very favorable conditions they cannot hope to do so once they are subjected to the economic test that comes sooner or later to all enterprises.

Manifestly, therefore, the whole transportation problem is in an experimental stage, awaiting the final

*Abstract of address delivered before first annual meeting, Mid-West Electric Railway Association, Omaha, Neb., June 12, 1924.

adjustments made necessary by the advent of the motor vehicle. The future from the street railway standpoint, however, is not without its promising aspects. While there are 15,000,000 automobiles in the country today, it is comforting to remember that during the period of this remarkable development there has been an increase in population of about 25,000,000. And more comforting still to your industry, this increase in population has been very largely in the cities. While the street car traffic has not kept pace with this growth, due to the use of the automobile as a substitute, present conditions indicate that we may be on the eve of another step in the readjustment, forced by the infirmities of the automobile itself.

Observations Show Inefficiency of the Automobile as a Transportation Means

A 10-hour observation of auto traffic along O Street, Lincoln, Neb., reveals that on an average five automobiles carry a total of seven persons. The daily traffic report of the street railway company shows that approximately 18,000 passengers are carried each day by street cars. The cars make 1,017 round trips—or 2,034 one-way trips per day. This means that an average of nine passengers are carried on each car per one-way trip.

The average seating capacity of street cars in Lincoln is about 36 passengers. Accordingly, 75 per cent of the service rendered during the entire day is wasted because it is not patronized.

An observation taken on Fifteenth and O Streets between 4 p.m. and 6 p.m. on May 19 showed that 53 street cars going east carried 1,481 passengers while 757 automobiles going in the same direction carried 1,079 passengers. For each street car carrying 28 passengers there were 14 automobiles carrying 21 persons.

The automobiles that passed during that time, if placed in a single line, would cover a distance of 1⅓ miles. The line of street cars would be three-tenths of a mile long.

On an average of one and one-half persons per automobile, it would have taken 18 autos to have carried the 28 people who rode a street car, or 987 to have carried all the street car passengers—nearly one and one-third times more autos than did pass during the two hours. The automobiles necessary would have formed a line nearly 4 miles long.

Nature brooks no violations of her laws. Punishment is swift and certain. Traffic congestion in our cities will ultimately be relieved because society will reach the conclusion that it cannot pay the appalling cost. Automobile manufacturers have already anticipated this development and are leading in the movement for safety regulation. The day of the unlicensed, unrestricted, unregulated use of the motor vehicle is approaching its sun-down. Human life is more precious than personal liberty. Sheer necessity will compel a more restrained use of the automobile. When it does the street car will return to a measure of its former popularity. For the movement of large numbers of people into, out of and through congested areas at low cost it has no equal. Like old Dobbin, however, it has lost prestige. In addition to having been made the prey of designing politicians, it has lost countenance with the general public through no fault of its own, but because its flashy and luxurious competitor has made a more romantic appeal to the public mind.

It is at this point that the recovery of the street railway industry begins. Old methods will necessarily have to be discarded with old conditions. Exemptions from special taxes and paving assessments must be secured. Further relief through rate increases is not to be expected until you can convince your patrons it is worth as much to ride in a street car as in a bus or taxicab. So far as that remedy is concerned, it is a job of salesmanship—the task of giving the public a new and more wholesome viewpoint. In the slang phrase of the street, the street railway industry has "got to go and get a reputation." Expressed in another way, a time-tried and valuable commodity must be put in a new and attractive package. When the inevitable reaction from the misuse of the automobile arrives the street railways must be ready to take advantage of it.

More efficient methods of operation must be developed, one-man cars should be further perfected and utilized, greater efficiency in equipment should be devised. You say that is not possible. I say anything is possible when we have to do it. And your industry has reached the crisis in its career when the *"must"* of the situation has become the dominant note. The public, whether it realizes it or not, must have street car service. It must be educated to that fact. You who are in the business must find ways and means of giving that service.

When the Germans had reached Verdun and threatened the very gates of Paris, the indomitable will of France found glorious expression and victorious fulfillment in the cry "They shall not pass!" That genius for overcoming obstacles that has been the characteristic of American progress will find a way in your industry. Last, but not least, the human element in your business must yield the full measure of its wonderful possibilities.

Publicity Is Necessary

The frank disclosure of information hitherto considered private and confidential has gone far to create a wholesome confidence in your good purposes. In this work your Committee on Public Utility Information has performed a conspicuous service. As one engaged for fourteen years in the newspaper business, I have a profound respect for the value of publicity. In these modern days, it is one of the essentials to the success of private business. To the public utility, operating as a monopoly, it is even more necessary and should be provided for with as much certainty as labor, fuel or capital. It must be intelligently prepared and placed, however, and skill and training of a high order are required. The bookkeeper or the plant superintendent cannot take an hour off once a week and prepare this material.

It is to the credit of the industry that it has taken its publicity work seriously and has perfected organizations in each state that have already developed a more healthy public opinion. Some one in this twentieth century has coined the very significant phrase—"the fanaticism of veracity." Perhaps it is a little too strong, but in a day of loose talking, mendacious assertions and wholesale appeals to prejudice, we need to get down to first principles, and I would recommend that the phrase be printed and framed, and hung in the office of every publicity representative as a constant reminder of the great need of eternally emphasizing facts. Not that these men have not been disseminating

the truth, but that in the face of wholesale misrepresentation their unremitting vigilance is imperative.

A straight line is the shortest distance between two points. This is as true of life as it is of geometry. It applies to the relations of men with each other. This is so despite the complexities of the twentieth century. The homespun days have gone, never to return. The simplicity of life is passing away. We live on the main highway and every passing caravan leaves a new contact. In the language of David Starr Jordan, "We must cultivate the social tact, the gentleness, the adroitness, the firmness necessary to carry out our own designs without thwarting those of others."

CO-OPERATION IS THE LAW OF THE HOUR

Whether we like it or not, we must co-operate. It is the law of the hour. It is another phase of human progress. Being compelled to work together we must cultivate anew the knack of getting along with each other. And in that respect the fundamental rules of conduct are still in force. The hearty handshake, the cheery greeting, the cordial exchange of ideas are as potent as ever.

And this brings us to the thought that there is no inherent conflict of interest between the utility and its patron. When I go to a merchant to buy a pair of shoes, I get something I need and I give him something he needs. It is a mutually beneficial transaction—a fair exchange. When the Ampere Electric Company sells 275 kw. of current to Citizen John Condenser it gets cost and a little profit. John Condenser gets some energy which he uses for his comfort or profit. There is nothing in the exchange itself to excite hostility. And yet, strange to say, there has been permitted to grow up a traditional resentment in the mind of Mr. Condenser for the company. What ought to be a happy relationship has developed into a strained neutrality, unfortunate for both. Intelligent co-operation is the one and only remedy.

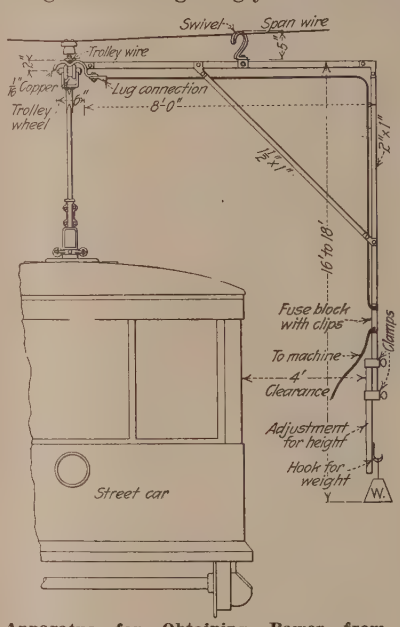
The railroads have made the approach to a better understanding through the formation of shippers' conference boards. These boards have been a common meeting ground for the exchange of complaints and ideas. The results have been amazing. Ancient grudges have disappeared. Misunderstandings have been cleared away. Suspicion and prejudice have dissolved under a frank disclosure of all the facts. Feelings of good will and friendliness have been kindled and controversies that had grown into "problems" have vanished like mist before the sun. And this happy condition of affairs has been as surprising to railroad men as to shippers. The procedure is simple, and it is sufficient only to bring the parties together in orderly fashion. Human contact does the rest. The experiment has demonstrated that when men with common interest and common purpose meet about a council table in an effort to reach a common understanding success is assured from the start. Under our very eyes the great and perplexing problem of transportation is being composed through the very simple process of the two parties at interest—the public and the railroads—sitting down to talk it over.

Another conspicuously successful adventure in co-operation has been undertaken by the federal and state commissions. For years they quarreled over jurisdiction. Overlapping authority produced friction and ill-feeling. Dealings were at arm's length. The situation was almost intolerable, and then one day some one thought of trying the plan of getting together to talk it over. The conference was so successful that a permanent plan for co-operation was devised, remarkable for its simplicity. Within two years mutual distrust has disappeared, confidence and good will have been substituted. Controversies that formerly culminated in lawsuits and rigid orders have yielded to joint action, and the powers of local and federal authority have been co-ordinated to the great advantage of all concerned.

Co-operation is practical. It works. It is not sentimental, but the finest sentiment grows out of it. Its possibilities are unlimited. The only wonder is that we have been so long discovering it.

Overhead Contact Permits Passage of Cars

A DEVICE for obtaining power from the overhead trolley wire for track tools, which allows the passage of cars without removing the contact from the wire, is used by the surface track division of the Brooklyn-Manhattan Transit Corporation. The contact is a sheet copper pan with a groove formed in its upper surface which is placed under the trolley wire. It is of ⅛-in. hard drawn copper, 10 in. long and 4 in. wide, the groove fitting snugly around the wire and providing a smooth underrun for the trolley wheel. This same type of pan was described in the JOURNAL of Sept. 2, 1922, page 319, where the supporting pole was mounted on an Indianapolis welder. The use of the contact has now been extended to other track tools not affording a support close to the track. The copper pan, in its new application, is attached to the short end of an inverted L-shaped frame. The frame is suspended from a span wire by a swivel hook on the short arm, so placed that the arm will be suspended horizontally. Weights placed on the long or vertical arm of the frame tend to rotate the device about the point of support, causing the contact to be pressed against the wire.



Apparatus for Obtaining Power from Overhead Trolley Wire Which Allows Passage of Car and Trolley Wheel Without Removing Contact from the Wire

The frame is made up of 1-in. x 2-in. wood reinforced at the joints with steel plates. The short arm is 8 ft. long, while the long arm is 16 to 18 ft. long, being adjustable for various heights of span wires. A diagonal brace connects the two members of the frame.

Connection between the contactor and the lead-in wire is made through a lug bolted to a lip of the pan. A fuse block is mounted on the vertical member, near the lower end. The lead-in wire is connected to the top of this block, while the machine wire is connected to the bottom of the block.

Types of Cars Operated in New Orleans on Which Good Pull-In Record Is Made. On the Left Is a Modern Light-Weight Steel Car, in the Center an Older Double-Truck Car, and on the Extreme Right a Single-Truck Car

217,728 Car-Miles per Pull-In

A Well-Organized System of Inspection and Repair Has Enabled the New Orleans Public Service, Inc., in 3½ Years to Eliminate 95 per Cent of the Pull-Ins and Cut Maintenance Costs to Half

By Robert M. O'Brien
Superintendent Rolling Stock and Shops, New Orleans Public Service, Inc.

IN MARCH, 1924, the New Orleans Public Service, Inc., operated an average of 217,728 car-miles for every car taken out of service on account of mechanical or electrical defects. This mileage should not be considered as an indication of what may regularly be expected in the future, however, but rather as a maximum figure resulting from a combination of particularly favorable circumstances during that month. Nevertheless the experience of this railway indicates that with proper organization and facilities it should be possible to maintain continuously an average of well over 100,000 car-miles per pull-in.

At the outset of a discussion of pull-ins it is well to explain the exact meaning of the term as used at New Orleans. Pull-ins are classified as "chargeable" or "not chargeable." A chargeable pull-in is any car which is removed from service because of the development of serious defects before the termination of its regular day's run as specified in the time-table. Cars which are removed from service because of accidents beyond the control of the mechanical department, such as automobile collisions, etc., are considered as not chargeable pull-ins.

Efforts are made to repair certain minor defects such as difficulties with the fare register, bell cords or gongs, by having a mechanic board the car as it passes the carhouse and travel with it for a short distance without taking such a car out of service. This is done more to promote the convenience of the passengers than to reduce the number of pull-ins, although, of course, it does have that effect also. Any car which is actually taken out of service before the termination of its daily run, however, is considered a pull-in, and is so listed in the records.

The secret of the elimination of the pull-ins lies in the development of an adequate system of inspection and repairs, the upbuilding of the morale of the mechanical department and placing the several carhouses on a competitive basis. Under the plan followed by this company the main office of the equipment department furnishes repair foremen with daily inspection reports showing the cars to be inspected, and separate cards detailing the parts to be examined. After the receipt of these cards at the stations, or carhouses, repair foremen notify the transportation department which cars are to be kept in the following day, and competent men are selected to make the inspection of the electrical and mechanical parts.

After making his examination of a car each inspector notes on a form specially prepared for that purpose the condition of the various apparatus. This report lists 34 different parts of the car equipment. Each part must be examined and if the inspector finds it in good condition he places his initials opposite that item on the card. The attention of the foreman is called to repair work that should be done by the absence of initials on the card. In such a case the foreman then calls a regular repair man to correct the defect and afterward O.K.'s the card. Cars are inspected on a 1,000-mile basis except some of the older rolling stock, which is inspected every 800 miles.

The number of miles run during the previous day by each car on the system is furnished to the equipment department by the auditing department at 1 o'clock every afternoon. The former department then tabulates the information on a large mileage sheet which shows for each car the daily mileage, the cumulative mileage since the last inspection and the total mileage

10 23-10m

NEW ORLEANS PUBLIC SERVICE INC.

INSPECTION REPORT

CAR No. _____

Date _____ 19 __ Last Inspection _____ 19 __

_____ STATION

I have inspected and now report the following parts in good condition.

	SIGNATURE
TROLLEYS	
Pole, Stand and Wheel	
CAR BODY	
Doors	
Windows	
Seats and Screens	
Gates	
Grab Handles	
Draw Bars, etc.	
Fenders	
Registers and Pulleys	
MOTORS	
Armatures	
Brush Holders and Brushes	
Fields	
Leads	
Cables	
Suspensions, etc.	
Gears and Pinions	
Oiling	
TRUCKS	
Wheels	
Axles	
Journals	
Truck Parts	
Brakes	
CONTROL SYSTEM	
Over Head Switch	
Controllers	
Reverse	
Rheostat	
AIR BRAKES	
Brake Valves	
Air Compressor	
Governor	
Pipes, etc.	
MISCELLANEOUS	
Light-Circuit	
Lightning Arrestors	
Signal Bells	
Fuse Boxes	

Car O K for Service _____

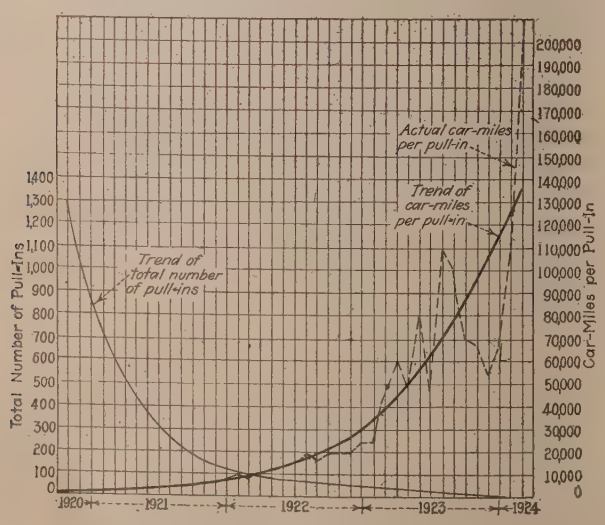
Car kept in for Repairs _____

Remarks _____

Repair Foreman.

The Inspector Must Sign for the Condition of Each Item on this Form

since the last general overhauling. Armature mileage for each motor is also tabulated on this sheet. Every Saturday the repair foremen are notified of any armatures which are approaching the mileage limit. Bearings are then immediately gaged for clearance between the armature and pole pieces. This is repeated weekly until the armature is removed for overhauling. At present all armature repairs, as well as repairs to trucks and wheels, are made at the various carhouses because the repair shops have not sufficient space in which to do the work. It is planned, however, to start an entirely new system of inspection on July 1. Under the new plan no armatures or fields will be removed at a carhouse, but the complete motors after having operated 40,000 miles will be sent to the assembly room at the Carrollton shop. There the motor will be knocked down and completely overhauled, tested and passed by an electrical engineer before being returned to service. Under this scheme it is thought that all electrical parts will be kept in nearly as good condition as when they were originally furnished by the manufacturer. It is planned to have extra trucks, motors, air compressors, controllers, line breakers, etc., so that all the vital parts of the car can be sent to the general shop, repaired and tested on this mileage basis.



A Steady Decrease in Pull-Ins Is Shown During the Last Four Years

The selection of 40,000 miles as a basis for the removal and overhauling of electrical equipment was made because experience showed that thorough examination and tests usually were needed after that length of operation. However, this figure was selected only tentatively and if it turns out that the expense of overhauling every 40,000 miles is exorbitant, the mileage will be increased. It is firmly believed, however, that a thorough overhauling and examination of equipment by a young graduate engineer will result in the discovery of many hidden defects and will prove to be a real economy.

Competition between the different stations is fostered by the publication of comparative records. A statement of cars taken out of service on account of defects is furnished monthly to the management and to all minor officials of the equipment department. It is placed also on the bulletin boards at all the carhouses. This is done so that each individual in the organization will know exactly what is being accomplished at the others.

The form is divided into the two major classifications already mentioned, pull-ins chargeable to the equipment department and those not so chargeable. Among the chargeable defects are such items as armatures rubbing poles, hot journals and charged cars. The classification of pull-ins not chargeable to the equipment department includes the items derailment, broken glass, accidents, split switches and troubles reported but not found. This tabulation shows at a glance the number of cars taken out of service at each of the five carhouses for these various reasons. Comparative figures for the previous month and the same month the preceding year are also given. At the bottom of the sheet the number of car-miles per pull-in is shown for each carhouse. Each repair foreman is therefore able to compare the work being done at his station with that being done at the other stations of the railway.

A statement of expenditure showing the amount of money spent on materials and labor in the various shops and carhouses is prepared monthly. While the primary effort has been to reduce the number of pull-ins, it has been the aim to accomplish this without running up large maintenance costs. The two accompanying charts show very clearly the success that has been attained by the company not only in increasing the car mileage operated between pull-ins, but also in reducing the maintenance cost per car-mile. In 3½ years the average miles per chargeable pull-in has been increased from 1,380 to the maximum of 217,728 mentioned above. At the same time the maintenance cost has been reduced from $0.057 to $0.021 per car-mile.

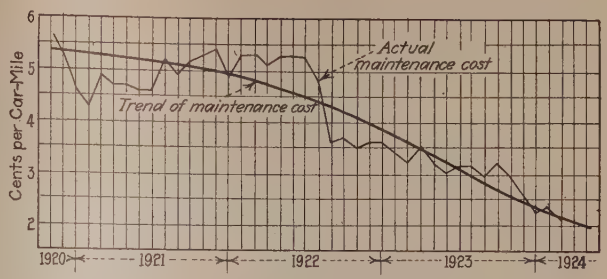
The reorganization which has accomplished these results was made on Nov. 1, 1920, under the new management which took over the operation of the company just prior to that date. The important part that should be played by the equipment department in giving good service to the public was immediately recognized. This department was acknowledged to be a vital cog in the railway mechanism, rather than being considered, as is so often the case, merely as a kind of necessary evil. The superintendent of equipment and the master mechanics at the various carhouses were provided with suitable offices and office equipment. If the master

mechanic has an office in which to work and a desk at which to sit, he goes at his work in a different spirit from that of the man who has to use an old packing case shoved off in some dark corner of the repair shop.

A program of regular meetings of station foremen once a month was inaugurated. At these meetings the various problems of the mechanical department are discussed and methods to overcome them are proposed. Genuine attention is paid to the views of every individual, and no attempt at dictation is made by the superintendent. With the idea of teaching them what the other fellows were doing and broadening their viewpoints, master mechanics, inspectors of equipment and foremen were sent to various railway shops and manufacturing plants in other cities. These trips were of material benefit to the company and have resulted in the abandoning of many old methods in favor of newer ones.

Previous to the reorganization of the mechanical department the engineering for that branch of the railway was done at the general engineer office of the company. Now, however, an engineer is employed to work directly with the equipment department, and his services have been invaluable. It is planned to extend this idea still further. Additional engineers will be secured and it is expected that the equipment department will then be able to do all of its own design, inspection and testing work. The technical knowledge possessed by an engineer, especially in connection with the testing of electrical apparatus, is felt to be an absolute essential in the efficient operation of the equipment department.

New cars and equipment have been purchased. Dipping tanks and baking ovens have been installed and have proved to be particularly valuable. Car hoists and cranes have been installed so that the men can do their work easier and better. By degrees the improved conditions were appreciated and a new spirit introduced with this department.



Along with the Reduction in Pull-Ins the Maintenance Costs Are Going Down

About 100 modern cars have been bought and are now in operation while 73 more are on order. The reduction in the number of pull-ins, however, cannot be attributed wholly to the operation of new rolling stock and the elimination of some of the older cars. More than 400 cars are in regular service in New Orleans, and the new ones, therefore, constitute only a fraction of the total. There are in operation a great many double-truck cars which are not new and about 200 old single-truck cars. Maintenance costs on cars of the latter type are high and constant care must be exercised to keep them in good condition and thus prevent pull-ins.

The recognition of the mechanical department by the executive heads of the company, the purchase of modern rolling stock and proper tools to enable the men to perform their work efficiently, and the development of a regular system of inspections and repair have created a spirit of enthusiasm and a desire to co-operate for the general welfare of the railway. The result of this has been better car service in New Orleans.

NEW ORLEANS RAILWAY & LIGHT COMPANY

STATEMENT OF CARS TAKEN OUT OF SERVICE FOR DEFECTS MONTH OF _____ 192 __

CHARGEABLE TO EQUIPMENT DEPARTMENT | NOT CHARGEABLE TO EQUIPMENT DEPT. | REMARKS

Armatures | Armature Rubbing Poles | Armature Shafts | Armature Bands | Melted Armature Bearings | Hot Armature Bearings | Hot Axle Bearings | Commutators | Brushes and Holders | Brush Yokes | Pinion | Field Bobbins | Motor Leads | Cables | Gears and Pinions | Gear Cases | Circuit Breakers | Controllers | Reversers | Relays | Headlights | Lightning | Lights | Electric Bells | Trolley Bases | Rheostats | Trucks | Axles | Wheels | Flanges | Journal and Boxes | Hot Journals | Air Brakes | Hand Brakes | Brake Rigging | Bodies | TOTAL | Windows | Seats | Steps | Doors | Heaters | Car Cleaned | Sand Rigging | Gongs | Guard and Doors | Guard Rods | Registers | Whistles | Draw Heads | Snow Scrapers | Wrecked By Shop | Wrecked By | Unclassified | TOTAL | Unclassified | Derailment | Doors | Brakes Class | Brakes Air | Split Switch | Trol. Rep., None Found | TOTAL | TOTAL CHANGES

ARABELLA
CANAL
POLAND
PRYTANIA
CARROLLTON
THIS MONTH
PREVIOUS MONTH
SAME MONTH LAST YEAR
MONTH THIS YEAR
MONTH LAST YEAR

Took out Armature No. .....
Type .....
Car No. .....
End No. .....
Date .....
Trouble .....
Station .....

Put in Armature No. .....
Type .....
Car No. .....
End No. .....
Date .....
Station .....

Number of Car Hours Operated _____
Number of Pull-ins _____
Monthly Mileage _____

Pull-ins Per Car Hour _____ Or One Pull-in for Each _____ Car Hours
Pull-ins Per Car Mile _____ Or One Pull-in for Each _____ Miles

	Arabella	Canal	Poland	Prytania	Carrollton		This Month	Previous Month	Same Month Last Year	Year to This Year	End of Month Last Year
Total No. Pull-ins											
Average Per Day											
Passenger Car Miles											
Car Miles Per Pull-in											
Number Chargeable to Equipment Dept.											
Average Per Day											
Car Miles Per Pull In											
Number Cars Operated											
Percentage Crippled											

Signed _____ Supt. Equip.

This Form Summarizes the Pull-Ins by Divisions and by Classification of Defects. The Insets Show the Armature Tags Employed

Financing Purchase of Coal for Employees

Plan Adopted by the Connecticut Company Has Enabled Its Employees to Secure the Quantities Needed at a Minimum Price

THE experience during the past winter of two large railways which undertook to finance the purchase of household coal for their employees was so satisfactory that the continuation of the plan is assured. The Connecticut Company was the originator of the idea and it has been followed by the United Railways & Electric Company of Baltimore.

So much enthusiasm has been shown by the employees of the Connecticut Company who availed themselves of the company's plan to distribute coal that the participation of a much larger number in a similar scheme next year is expected. A brief description of this plan was given in ELECTRIC RAILWAY JOURNAL for April 28, 1923. During the past winter 987 employees ordered 4,691 tons of coal at a total cost of $63,000. All of this coal was delivered prior to March 1, 1924.

The great difficulty in obtaining an adequate supply of coal for household purposes, as well as the abnormally high prices prevailing for such coal as was available, induced the company in the spring of 1923 to propose a plan to assure its employees an adequate supply at a reasonable price. Such employees as wished to avail themselves of the offer had their full winter's requirements of coal delivered during the summer at a time convenient to the retail dealers. Payment to the dealers was guaranteed by the railway and deductions made from each individual's weekly pay during the period from May to November. In this way the employees obtained advantage of the lower price possible through buying in ton lots rather than in smaller quantities. Moreover the plan enabled the dealers to deliver coal during the spring and summer months when there was slight danger of interruption in rail shipments. In a small measure it has tended toward greater equalization in mining activity.

Early last summer the United Railways & Electric Company undertook a similar plan. Up to Feb. 1, 1924, 1,952 orders had been placed with the company for 5,250 tons of coal at a total cost of $84,022. All but a very small percentage of this coal had been delivered and paid for up to that time. A quarter of 1 per cent of the total represents the loss through coal delivered but not paid for.

On the basis of an average price of $15 per ton the railway arranged to collect from its employees at the rate of 75 cents per ton per week. This meant that the account would be paid off in twenty weeks. The company pays cash for coal and takes advantage of the cash discount of 25 cents a ton, and this saving is passed on to the employees.

The plan has been so successful that at the request of the Employees' Benefit Association it has been extended to become a permanent part of the company's activities. Employees may order coal at any time of the year and pay for it as described. The company believes that if such a scheme were put into effect by other large employers of labor it would materially improve the peak conditions in the coal mining industry and give the employees the benefit of purchases at the summer season price without the need to finance the purchases so far in advance of actual need for the coal.

The Readers' Forum

Believes Wheel Welding Can Be Done; Wants to Know Right Technique

INDIANA, COLUMBUS & EASTERN TRACTION COMPANY

SPRINGFIELD, OHIO, June 6, 1924.

To the Editors:

I am very much interested in the reconditioning of steel wheels by building up the worn flanges by electric welding. This is not a new subject, as flange welding has been practiced for some years by a few mechanical men with varying success. In our own shop we have built up the flanges on several wheels that have given upward of 40,000 miles of service on our heavy cars, which performance is entirely satisfactory. On the other hand, we have had wheels develop serious cracks which we feel certain were due to welding the flanges, making them unsafe for use. I understand this has been the experience of practically every one who has undertaken to weld flanges.

These experiences have led some to abandon and condemn the welding of flanges as impractical and unsafe. But the fact that even a few welded wheels have been an entire success, also the fact that wheels from certain makers crack more than others, leads me to believe that universal success is a possibility. The reason that uniform results have not been obtained is no doubt because conditions were not uniform. My feeling is that we are all groping around in the dark and when we secure a good result we do not really know why or how we did it, likewise with a bad result.

My contention is that the steel wheel makers should take up the problem in a thoroughly scientific and practical manner and be prepared to supply the railways with wheels that can be successfully welded. They should also be prepared to furnish the proper welding rod and specify what rod to use on their wheels, together with the current strength, voltage over arc, etc., so that the railway men can depend on being able to do this work without fear of cracked wheels.

Recently I wrote on this subject to one company which manufactures steel wheels and the reply was that it was very much interested in this matter, as it felt that if worn flanges could be successfully renewed on steel wheels there would be but few chilled wheels sold, but that its engineers had been working for two years on the problem and so far had not met with success. In practically every attempt incipient cracks were discovered which tended to be progressive.

In this connection I am reminded of the slogan: "The fellow who says it can't be done is interrupted by the chap who is doing it." The wheel company men referred to gave me a very pressing invitation to visit their laboratory and assured me they could convince me of the impossibility of flange welding. Still I am not convinced and furthermore refuse to be convinced that this thing cannot be done.

In order to see what savings can be made by flange welding it first must be noted that in about 90 per cent of the cases sharp wheel flanges occur on one wheel only. Therefore, if this one flange can be renewed by welding, it will in many cases not be necessary to turn the treads down in the lathe, and if this process can be kept up, that is by renewing the flanges as they

wear down, it should increase the ultimate life (or mileage) of the pair of wheels by some three to five times that obtained when wheels have to be turned down to a smaller size every time a sharp (or thin) flange develops. As to the saving that can be effected, I have made the following rough comparisons based on our practice, which I consider conservative:

Cost of two new 37-in. steel wheels	$95.00
Cost of mounting wheels on axle	5.00
Cost of turning pair of wheels three times	4.50
Total cost of two wheels present method	$104.50
Probable total mileage	200,000
Cost per 1,000 miles	$0.52
Cost per 1,000 wheel-miles	$0.26
If flanges are welded they will probably have to be welded about eight times during the life of the wheels.	
Cost of welding flange on one wheel	$4.00
Cost of welding flange on one wheel eight times	$32.00
Total cost two wheels ($95 + 5 + 32)	$132.00
Probable total mileage	750,000
Cost per 1,000 miles	$0.176
Cost per 1,000 wheel-miles	$0.88
or about one-third the present cost	

The above figures certainly look attractive and I feel reasonably sure they can be attained and probably surpassed if the one point of dependability can be secured. My purpose in writing you is to enlist your support. What I am interested in is getting the thing "put across" by some means and I think the ELECTRIC RAILWAY JOURNAL is in a position to lend material aid in doing this. Possibly the manufacturers who are producing the welding outfits could also be interested in helping to put this over.

F. J. FOOTE,
Superintendent Motive Power and Equipment.

[Methods for neutralizing internal stresses from welding wheels were discussed in an article by W. J. Merten in the ELECTRIC RAILWAY JOURNAL for April 21, 1923. Several methods which have been used successfully were described in the Aug. 18, 1923, issue in connection with a survey of wheel, gear and axle practice.—EDS.]

Thinks Pneumatic Equipment Desirable

NEW YORK, June 4, 1924.

To the Editor:

In reading my ELECTRIC RAILWAY JOURNAL of May 24 I was quite interested in noting several statements in your article on the new car design adopted by the Springfield Street Railway, and would like to remark on type of door control mentioned, which is not at all in harmony with the present trend of electric railway car design. It is mentioned that manual operation of the folding door is preferred to pneumatic operation because of the danger of freezing of pneumatic door engines and the piping. It has been my privilege to inspect electric railway operation from Sydney, Nova Scotia, to Fort Worth, Tex., and I have specially observed pneumatic door operation from every standpoint. The only cases of freezing that I observed, which were very few, have been due to conditions peculiar to the individual installation, which could readily be corrected and were. At this moment I have a vivid recollection of the little one-man safety cars in Sydney plowing through a blinding snowstorm without a gap in schedule and with perfect door operation. These cars were equipped with the safety car equipment and the doors operated by a pneumatic door engine.

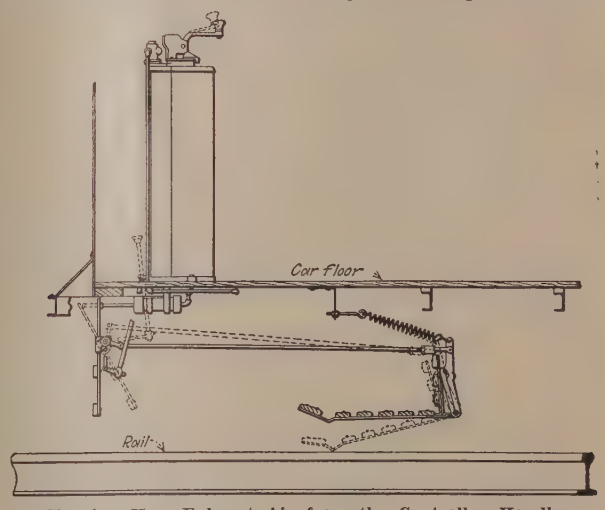
Another statement in your article criticises the sudden starting of cars where doors are interlocked with contactors or line switches, where the car is started by the closing of the doors. This is another case that can be controlled by proper installation. The Third Avenue Railway of New York City has used such operation for more than ten years through all the vagaries of New York traffic, and the resulting operation has been smoother than on the few cars which are not equipped with safety interlocking door control. The secret, if any, lies in using a sufficient amount of resistance on the first step of the controller with the proper grading of the resistance on the remaining steps. Furthermore, there are thousands of cars equipped with this type of safety interlocking door control throughout the country, all of which seem to be giving the very best results. This is progress, and it is impossible to stop progress of the right kind.

G. H. VANDER VEER,
Car Equipment Engineer National Pneumatic Company.

Life Guard Operated by Air

Connection for Safety Device Is Made to the Exhaust Pipe from the Controller Handle on Safety Cars

IN ORDER to make the operation of the life guard automatic the Savannah Electric & Power Company, Savannah, Ga., has equipped all of its safety cars so that the tray drops whenever the emergency devices function. An extension has been welded upward from the apron of the life guard and a cylinder similar to the circuit breaker knock-out cylinder is placed under



Showing How Exhaust Air from the Controller Handle Trips the Life Guard

the floor of the car. Connection to this cylinder is made from the exhaust air pipe from the controller handle. When the operator removes his hand from the controller this exhaust air operates a plunger which hits the welded extension to the apron and trips the tray.

When the car is moving at a speed of 20 m.p.h. it has been found that the life guard can be dropped in a distance of 3 ft. After tripping, the tray is returned to its normal position by means of a treadle. Air connections to perform this work are being considered, however. A cut-out valve is placed under the floor below the controller, to eliminate the automatic feature if it should be so desired at any time. All safety cars of the Savannah Electric & Power Company have been equipped in this way at a cost of approximately $10 per car.

Equipment Maintenance Notes

Reclaiming Rail Bonds in Brooklyn

By G. H. McKelway
Engineer of Distribution
Brooklyn-Manhattan Transit Corporation

WHEN bonds of the compressed and expanded terminal type were to be removed from tracks in Brooklyn, an old method was to cut off the terminals with a cold chisel and save only the length of the stranded conductor between the terminals. The part removed was turned into the storeroom and later sold as scrap copper. However, many bonds reached the junk dealers in a more direct but unauthorized way.

In order to prevent this waste a method of salvaging the complete bonds was tried. Instead of cutting off the terminals, these were punched out of the rail and those which were unfit for reuse in the condition in which they were removed were filed to necessary dimensions. This work was expensive, and a first-class job was seldom obtained, as the terminals when finished were not round and were too small to fill the holes in the rails and provide a proper sized button on the end. As a result, in reusing these bonds they were installed only in sidings or points where it was expected to relay the track.

An improved method of finishing the terminals is now being used which makes them suitable for reinstallation in place of new bonds. A special milling tool is used in a drill press. This has knife blades on the inside and lower end. With this milling tool fitted over the terminals, the excess copper from expanding the terminal in the web hole is quickly cut away to the exact dimensions required, and where the terminals are distorted from being driven out these are trued up. Some of the copper is removed from the shoulder of the terminal so as to make the stud long enough for reinstallation. This method enables the reuse of the bonds in rails with the same or even greater web thickness than those from which they were removed and a satisfactory button is obtained.

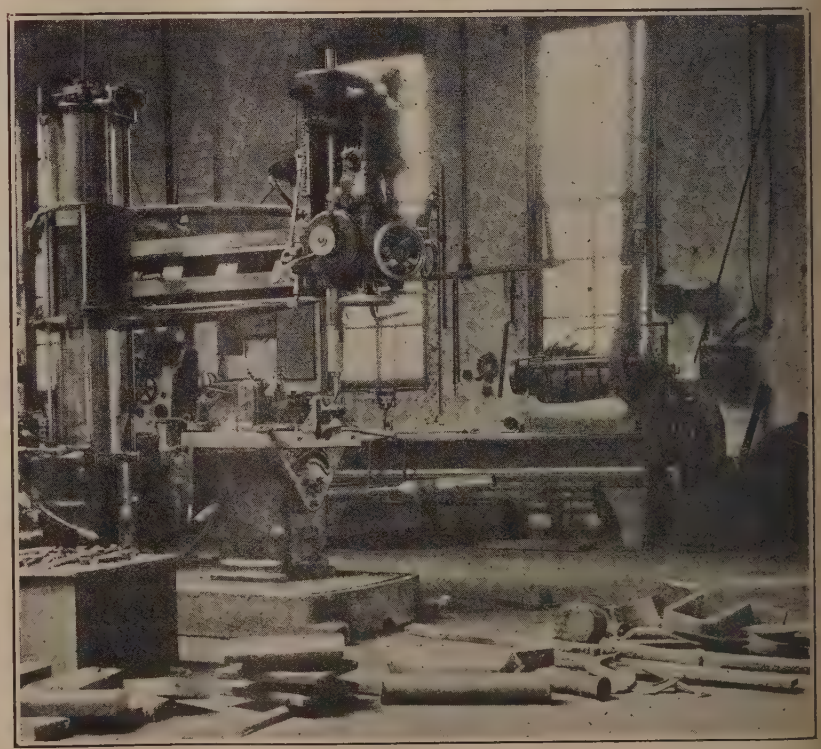
In some cases where a number of heavy bonds are installed in the same locality the studs of the bonds are cut from the terminals, leaving the sleeves in place around the end of the strands. The sleeves are then welded to the base of the rail. The sleeve around the end of the strands is of great advantage as it holds them tightly together until they can all be welded to the rail. It also prevents the burning of the strands, which might occur if heat were applied directly to the individual strands instead of to a number at the same time.

High-Speed Drill Proves Economical

A FOSDICK high-speed radial drill with Westinghouse control is used in the Fulton County plant of the Georgia Railway & Power Company, Atlanta, Ga., to drill material of all kinds—from brass to tool steel. For such articles as brake beams, levers, etc., which require several holes to be drilled, this machine is said to save from 50 to 75 per cent of the labor cost. For drilling single holes of small size, the new machine is not greatly superior to the old, but for large single holes, 2 in. or more in diameter, the saving by the use of this radial drill is from 75 to 80 per cent. This machine was installed in the fall of 1923, and has "kept the floor clear," as the shopmen say, ever since.

Oxyacetylene Welding Wagon

THE accompanying illustration shows a type of wagon used quite extensively in the Harmon shops of the New York Central Railroad for mounting oxygen and acetylene tanks and carrying the necessary welding equipment for this class of work. The tanks are mounted on a sheet steel platform and the framework required is of strap iron 1½ in. x ¼ in. Rubber mats ⅛ in. thick are installed underneath the tanks and are kept in position by



A High-Speed Drill Used at Atlanta Which Always Keeps Ahead of the Job

gle iron brackets at the bottom. steel top plate is used for keeping e tank in position at the top. The les through which the tanks pass this plate are larger than the ameter of the tanks and leather ds are used to fill in the space.

The large wheels for the wagon re 30 in. in diameter and were ob-ined from discarded hand baggage ucks. A third wheel, 8 in. in ameter, is arranged at one end to wivel and to take the load at that nd. There is a pocket the entire ngth of the framework about 6 in. ide for holding the welding rods nd torches. A tool box is con-ructed on the end of the frame-ork and in this is installed a

Convenient Type of Wagon for Oxyacetylene Welding Equipment

yrene fire extinguisher, a rack for olding various sizes of welding ps and various welding torches. A ece of iron conduit forms the andle. This is welded to the frame nd is bent to the necessary shape.

Charging Pull-Ins Against the Inspector

N THE shops of the Memphis Street Railway, Memphis, Tenn., ach car inspector is required to rn in daily a signed report show-g the number of cars he inspected at day and listing the parts ex-mined. A copy of the form used r this purpose is shown in an ac-mpanying illustration. The in-pector is then held responsible for e satisfactory performance of ese cars.

When a car is pulled in from the ad on account of trouble which ight have been prevented by proper spection, the master mechanic oks over the daily reports to de-

Dick Prescott Resumes His Work

Unaware of Impending Events

THOMAS MULLANEY was standing as Mr. Milburn entered his office. From his attitude and manner, it would have been apparent to a keen observer that the visit of the general manager did not catch him entirely by surprise as it had Steve White, the carpenter foreman, since Steve had called Mullaney's office and informed him of the important visitor who was headed that way.

"Sit down, Mr. Milburn," said Mullaney, as soon as Dick had closed the door. Although this was his first meeting with the new general manager, Mullaney had already acquired a wholesome respect for his ability as an executive. Both through letters and telephone orders and also from opinions expressed by department heads, the feeling had spread throughout the company that here was a boss who knew his business and was accustomed to carrying out his ideas.

An unannounced visit from the general manager, coming out to the shop thus informally and unattended, was new in the long years of Mullaney's experience and was so unlike previous precedent that he could not avoid mentioning the fact.

"This is kind of a little surprise to us, Mr. Milburn. We ain't accustomed to havin' the general manager visit this shop very often."

"Well, I've been trying for several days to get out here to go through the shop with you and this is the first afternoon I've had the opportunity. I want to take a turn through the various departments today to get acquainted, and you may be assured that I shall keep closely in touch with the shop in the future. This is one of the most important spots on the property. You see, you are in a position to make or lose a great deal of money for the road. In addition, you men out here are a vital part of any program of improvement which is undertaken, for without efficient co-operation from this end it will be impossible to maintain the kind of service that I feel this property must give if it is really to fulfill its responsibilities to the car riders."

"Well, we ain't got a great deal out here to talk about, Mr. Milburn. I've been in this shop for well nigh on thirty years and it's always been considered, so far as I could figure out, a kind of necessary nuisance. About the only time we have ever seen the general manager has been when we had to go down to take up demands by the men for more pay."

Mr. Milburn said nothing in reply, but showed by his manner that he was ready to start out into the shop. Thomas Mullaney reached for his old slouch hat and led the way into the outer office.

In the meantime Dick Prescott had returned to the damaged car upon which he had been working as a carpenter's helper, unaware that this little incident would result in opening for him the kind of an opportunity which he earnestly desired.

"Who was the guy that was all dressed up?" said Bill Newman, a carpenter who had grown gray and wrinkled in the Consolidated shop.

"Why, that was Mr. Milburn, the general manager."

"What kind of a guy is he?"

"Oh, he seemed very pleasant indeed."

"Asked a lot of questions, didn't he?"

"Yes, quite a number. He was very much interested in many details about the shop."

"Kind of had Steve White flustered for a minute, didn't he?"

"Why, I don't know. I guess Mr. White was surprised to see him."

"Well, that's the kind of a boss I like to have. One who ain't too good to get right out on the job hisself to see what's goin' on. That's the kind of a guy that knows a man by his first name after he's worked in a shop twenty years, like I have. How kin these guys downtown know what this shop needs widout gettin' out here once in a while to see what the joint looks like, eh? I'll bet'cha this fella knows his business, an' if he don't he'll learn pretty quick."

Dick did not need to reply, for Bill, who had just caught sight of the figures of Mullaney and Mr. Milburn entering the carpenter shop door, suddenly became very industrious and discontinued his comments.

Form 6084

The Memphis Street Railway Company

DAILY REPORT OF CARS AND EQUIPMENT INSPECTED

Day of Week ..... Date .....

PARTS INSPECTED	CAR NUMBERS								
Trucks, Truck Bolts, other Parts	1	104	141	178	404	523	560	611	708
Brakes	2	105	142	179	405	524	561	612	709
Brake Chains	3	106	143	180	406	525	562	613	710
Wheels and Axles	4	107	144	181	407	526	563	614	711
Sand Boxes	5	108	145	182	408	527	564	615	712
Floor Gongs	6	109	146	183	409	528	565	616	713
Motors, Bolts, Gear Cases	7	110	147	184	410	529	566	617	714
Armature Clearance	8	111	148	185	411	530	567	618	715
Fenders	9	112	149	186	412	531	568	619	716
Outside Journals, Lubrication	10	113	150	187	413	532	569	620	717
Motor Leads	11	114	151	188	414	533	570	621	718
Carbon Brushes	12	115	152	189	415	534	571	622	800
Brush Holders	13	116	153	190	416	535	572	623	801
Lubrication	14	117	154	191	417	536	573	624	802
Trolley Wheels, Poles and Bases	15	118	155	192	418	537	574	625	803
Trolley Ropes and Trolley Catchers	16	119	156	193	419	538	575	626	804
Grab Handles	17	120	157	194	420	539	576	627	805
Steps	18	121	158	195	421	540	577	628	806
Gates	19	122	159	196	422	541	578	629	807
Doors	20	123	160	197	423	542	579	630	808
Seats	21	124	161	198	424	543	580	631	809
Registers	22	125	162	199	507	544	581	632	810
Bell Cords and Straps	23	126	163	200	508	545	582	633	811
Glass	24	127	164	201	509	546	583	634	812
Signs	25	128	165	202	510	547	584	635	813
Headlight Glass	26	129	166	203	511	548	585	636	814
Air Compressor, Lubrication	27	130	167	204	512	549	600	637	815
Air Governors	28	131	168	205	513	550	601	638	816
Air Valves	29	132	169	206	514	551	602	639	817
Air Gauges	30	133	170	207	515	552	603	700	818
Controllers, Circuit Breakers, Fuse Boxes	40	134	171	208	516	553	604	701	819
Lamp Circuits	41	135	172	209	517	554	605	702	820
Heaters	42	136	173	210	518	555	606	703	821
Push Buttons	43	137	174	400	519	556	607	704	822
Cars Washed—Inside	44	138	175	401	520	557	608	705	823
Cars Washed—Outside	50	139	176	402	521	558	609	706	824
	60	140	177	403	522	559	610	707	

The car parts and apparatus as above checked have this day been inspected and are in good order.

.....Inspector

.....Foreman

NOTE—Each employe is required to check the parts and apparatus which he is designated to inspect and numbers of cars inspected, by running line through same. No two inspectors will report on the same blank form.

When repairs are made, car number and material used thereon must appear on reverse side of this report.

Form Used by Inspectors to Report Numbers of Cars Examined

termine which inspector last examined the car, and charges the failure against him. On a large chart which is posted on the bulletin board in the shop, the number of the cars pulled in are entered under the proper date opposite the name of the inspector responsible. If no cars are pulled in during the course of a month an inspector is credited with 100 per cent efficiency, and 10 per cent is deducted for each pull-in.

This report of the comparative efficiency of inspection was developed in October, 1923, the record for that month being shown in an accompanying table. The charts are posted the first of each month and have created quite a lot of friendly competition among the shop men. For April, 1924, the latest month for which complete records are available, every inspector had a record of 100 per cent efficiency.

Building Up Worn Equalizing Bars

DUE to the vertical motion of the truck equalizing springs considerable wear takes place on the equalizing bars where they rub against the pedestal. In the truck overhauling program at the shops of the Philadelphia & Western Railway the equalizing bars are taken off and the worn faces built up by electric welding. When the equalizing bars are replaced they are turned around with worn faces outside.

Worn Face of Equalizing Bar Built Up

A spacing block is also set on top of the journal box between the two equalizing bars. This comes between the two pedestal jaws, thus tending to keep the equalizing bars away from the end of the truck pedestal and so reduce the wear.

THE MEMPHIS STREET RAILWAY COMPANY—MONTHLY EFFICIENCY REPORT, DAY AND NIGHT INSPECTORS

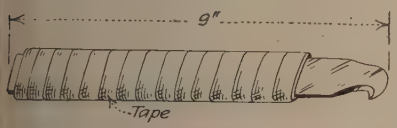
Month of October, 1923

	Inspector	Date 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Per Cent Efficiency
Air	Puryear, R. M.																																100
Armatures, motor be rings, brush-holders, etc.	Davis, G. T.																						549										90
	Burnette, G. L.							556																				544					80
	Stacks, J. T.																		209														90
	Fowler, W. A.																																100
	Palmertree, T.																																100
	Fry, W. R.													549				581															80
Brakes	Gresham, L. D.																																100
	Gresham, E. G.																																100
	Harriman, A. S.																																100
Car bodies, doors, fenders, etc.	Hearn, H.																																100
	Hughes, E. H.																																100
	Helms, E. E.																																100
	Murran, Jas.																																100
	Bailey, W. A.																																100
	Reavis, C.																																100
Electrical equipment	Yancey, A. T.								210																								90
	Spencer, C. C.									571																							90
	Hopper, C. E.																		552														90
	Murry, F. T.																																100
	Clinton, J. W.																																100
Journal oiling, Trolleys	Spraggin, H.																																100
	Sherwood, L. K.																																100

Percentage based on 10 failures.

Handy Commutator Trimming Knife

AFTER commutator slots have been milled, a burr of copper is left on the edge of each bar. Also, when commutators are turned in a lathe some of the copper is drawn over the edge of the slot, and some who have studied the problem closely



This Knife Is Used for Trimming the Edges of Commutator Bars

believe that the drag of the turning tool tends to "hard draw" the copper at the edge of the slot.

A simple type of knife, used in the armature room of the Kansas City Railways Company, has been found to be very handy in finishing the edges of the commutator slot after either milling or turning operations. This type of knife is quickly made from a discarded hack-saw blade by grinding the end to the proper shape and covering the remainder of the blade with plenty of tape to form a secure handle, as shown in the accompanying illustration. The knives are made up in pairs; that is, they are ground right and left hand. The hook-shaped cutting edge near the end is dragged along the edge of each slot and quickly trims off the burr so smoothly as to require no sanding of the commutator when the operation is completed.

Removing Coils from Impregnated Armatures

WHERE windings have been impregnated or coated with varnish or hydrolene gum, it is sometimes thought that the coils cannot be repaired and that they must be stripped out and the armature entirely rewound. Many windings which have been coated with varnish or filled with certain impregnating compounds can be repaired satisfactorily, however, and some suggestions for removing coils from impregnated armatures are given in an article by J. L. Rylander of the Westinghouse Electric & Manufacturing Company, published in December, 1923, issue of *Electric Journal*. Windings filled with bakelite or cement, however, cannot be repaired satisfactorily.

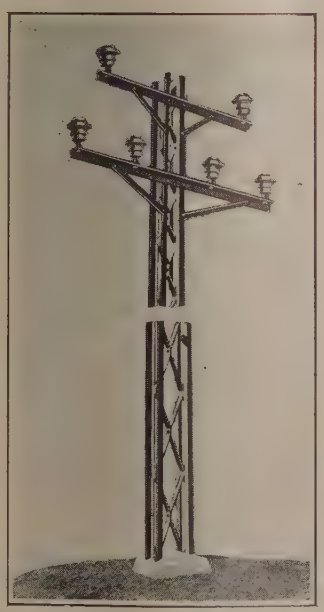
To remove a few coils from varnish treated or impregnated armatures, the slot and end portions of those coils that are to be raised should be covered with a coat of paraffine, about ¼ in. thick. The part of the winding where the coils are to be raised should then be heated. The varnish softens at about 100 deg. C. and loses its sticking quality and the melted paraffine cuts into the varnish sufficiently to act as a lubricant. The best method of heating the armature is in an oven, where the complete winding is heated until the innermost part of the coils and insulation reaches the required temperature. A blow torch can be used if applied with discretion.

In some cases where the varnish has not been sufficiently warmed, the coils will stick to the paper slot liner and in such cases it is advisable to insert a thin knife along both sides of the coil, the full length of the slot between the coil and the paper. This will separate the coil from the paper slot liner. If both the bottom and top coil are inclosed in a paper cell the top coil can be raised easily. The principal thing is to apply plenty of paraffine and heat the whole winding to approximately 100 deg. C.

New Equipment Available

Truscon to Make Steel Poles

ANNOUNCEMENT has just been made by the Truscon Steel Company, Youngstown, Ohio, that the new steel pole department of that company is now ready for a quantity production schedule and is prepared to manufacture steel poles of all sizes



Truscon Steel Pole Made from Channel Iron

up to 50 ft. in length. The Truscon steel pole is adaptable for use on transmission and distribution lines, telephone, trolley and street lighting systems and for many other purposes.

A feature of this pole is its simplicity of construction, being pressed from 5-in. to 12-in. steel channels or I-beams. It is so designed that no special equipment is needed by the lineman in ascending or descending, thus eliminating pole steps or the necessity for use of spurred climbers. It is made by pressing a portion of the web of the channel or I-beam out to a predetermined angle, then riveting this pressed-out section to a like section of another channel or I-beam.

Before production was begun and the pole was placed on the market, it was subjected to practical tests under varying conditions over a period of two years. It is claimed by the manufacturers that when this pole is anchored in concrete and painted about once in five years it will last indefinitely. Due to simplification of manufacture and quantity production cost of the steel pole is said to be about the same as that of wood poles; in some sections of the country it is less.

Where more than ordinary strength of pole and extra length is required, the pole can be made in combinations of two or more.

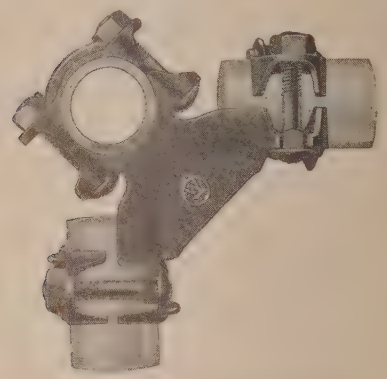
A complete line of fittings has been designed for the steel pole to fit any size standard cross-arm, either wood or steel. The cost of these fittings, which will all be galvanized, is no more than the cost of ordinary through bolts used in general construction work.

The element of public safety has not been overlooked in the design of the copper steel pole. Due to a lack of pole steps and because of the sharp angles formed in joining the riveted web sections, it is impossible for any youngster or other person than a lineman to ascend the pole.

Interchangeable Pipe Fittings

A LINE of structural pipe fittings for use with common wrought iron or steel pipe in the erection of electrical switching equipment, racks, railings and bench frames has been placed on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

These fittings consist of a relatively few unit castings which may be arranged to produce a large



Side Outlet Tee Constructed with Interchangeable Pipe Fittings

variety of combinations. They are made of malleable iron. The principal feature of the design is a ribbed yoke which clamps over the pipe with carriage bolts to the other unit part. Since the bolt spacings are uniform, parts designed for a certain size pipe are interchangeable with all others for that size. The form of the yoke and other unit parts is such that a considerable area of contact with the pipe is secured. As the fittings are bolted up they yield slightly, due to the malleable characteristics of the iron, until a perfect fit is obtained.

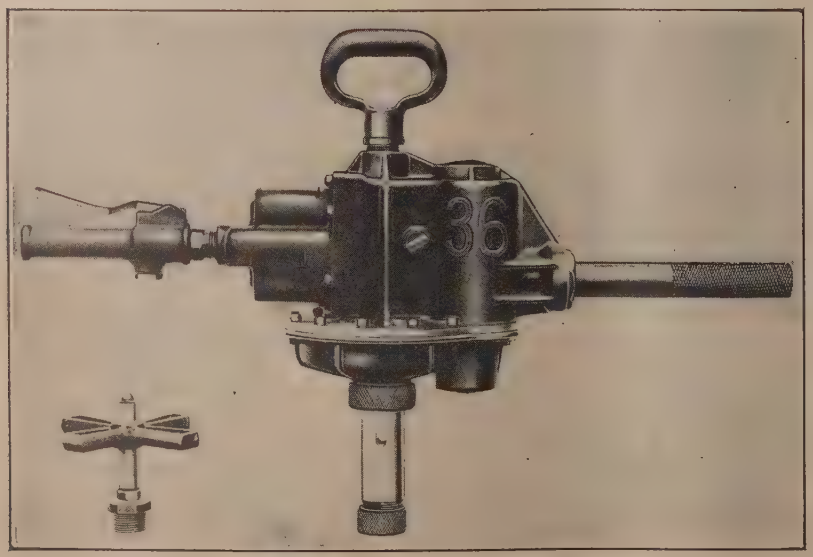
The fittings are designed for two standard pipe sizes, 1¼ in. and 2 in., and for combinations of these sizes, with a few fittings of ¾, 1 and 1½ in. size for light switchboard frames and for clamping insulators to pipe frames. They are furnished in either a black gloss baked finish for indoor use or are galvanized for outdoor installations.

Portable Air Drill

IN ORDER to meet the demands for a portable air drill for reaming service, the Chicago Pneumatic Tool Company, New York, N. Y., has brought out a new drill designated as No. 36 Red Giant. It weighs 35 lb. Particular attention has been given to provide perfect balance, so that it is easy to handle and control. The spindle is an extension type with a tang slot for convenience in ejecting the reamer or drill.

The cylinders are of the double-acting type, and provided with packing glands which prevent leakage of air into the crank-case. The pistons are turned from special low-carbon steel bars and accurately ground to size. All valves are of the balanced piston type and have no pressure holding them to their seats. As they move but one-twentieth of their length and are devoid of rocker arms and gears, they require very little power for operation. The valves are located between the cylinders with very short ports, thus providing air control close to the cylinders and effecting economy in the use of air.

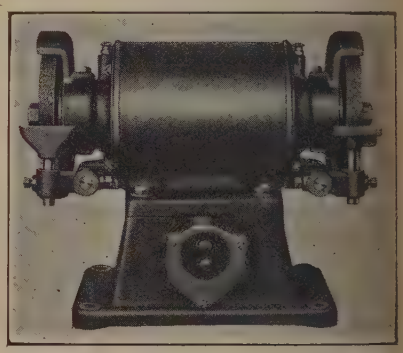
The crankshaft is forged from high grade nickel steel, heat-treated to give high tensile strength in the throws and hardness at the wearing points. It is mounted on three ball bearings, the extra one insuring proper shaft support on both sides of the main drive gear and reducing friction. Splash lubrication is used and as there is no air to bleed from the crank chamber, no lubricant is carried out with the escaping air and lost.



High-Speed Portable Air Drill

Six-Inch Bench Grinder

A NEW bench grinder of small size has been brought out by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The grinding wheels are fitted directly on the spindle, and the grinding rests are adjustable and can be removed if desired. Two grinding wheels 6 in.



Small Grinder for Very Light Grinding

in diameter are used and the height of the grinder from the bottom of the base to the center of the spindle is 8 in. The grinder weighs 70 lb.

Ball bearings completely inclosed from dust and grit are provided with heavy felt protector washers on each side of the bearing housing. The grinder is driven by a ¼-hp. motor, and a motor switch is conveniently mounted and protected in the base. The switch is equipped with thermostatic control which provides the same characteristics as a fuse, and gives maximum protection to the motor. Safety combination wheel guards as shown in the illustration can be supplied if desired. This guard is adjustable to any angle and can be moved back as the grinding wheel wears, thereby giving full access to the grinding wheel with maximum guard protection. It is interchangeable with the standard open-end guard.

Association News & Discussions

Canadians Hold Successful Convention

Rail Joints, Operating Problems, Traffic Congestion and Safety Were Main Topics at the Ottawa Meeting, Which Was Held Jointly with the Canadian Electrical Association—Exhibits Attracted Attention

THE Canadian Electric Railway Association and the Canadian Electrical Association combined this year to hold their annual conventions at Ottawa, June 11 to 13. The entertainment features and the exhibits were held in common, while the sessions of the two associations were conducted independently. The total attendance at the convention was about 400, of which nearly half were railway men.

On account of the resignation of President H. H. Couzens of the railway association, who has gone to Rio de Janeiro within the last month to become vice-president of the subsidiaries of the Brazilian Traction, Light & Power Company, the meetings of the electric railway association were presided over by D. E. Blair, its vice-president and superintendent of rolling stock Montreal Tramways.

The secretary in his annual report stated that there are now 35 member companies which operate 87 per cent of the trackage in Canada and 93 per cent of the equipment. In addition there are 31 associate members who are manufacturers of electric railway equipment.

Safety Committee Report

The safety committee, W. R. Robertson, general superintendent Hydro-Electric Railways, chairman, presented an elaborate report on safety work in Canada. A number of plans were advocated to insure greater safety of street railway operation. One that was particularly stressed was the inauguration of the so-called boulevard stop, where the street with car tracks is considered a main thoroughfare and vehicles approaching on intersecting streets are required to make a safety stop before crossing. This system, according to the report, does not affect the street railway so much as it helps the automobiles, as those running on the main streets so designated are able to proceed without delay at the crossings, while those approaching have greater safety.

In Toronto it was found that 53 per cent of the automobile accidents occur when vehicles turn out from the parking space without warning, and only 3 per cent are at intersections. Automobiles running into cars furnish 35 per cent of the accidents.

In the discussion J. F. H. Wyse, manager Ontario Safety League, contended that the greatest thing to reduce accidents is to obtain legislation requiring each automobile or truck driver to secure an individual license. C. L. Wilson, Toronto, suggested that a physical examination, including eyesight, should be a prerequisite to obtain such a license. C. B. King, London, Ont., urged uniform reporting of accidents throughout Canada in order that they might be studied and the proper remedies worked out.

Mr. Robertson stated that on his road reports are prepared of all accidents, which are used as a basis for the preparation of charts. Copies of these charts are posted in the trainmen's rooms and others are given the municipalities for the use of the police departments. He thinks that this publicity for the accident records has been instrumental in the campaign for the establishment of boulevard stops on his lines. Mr. Blair thinks that in order to get uniform reports of accidents, blanks should be prepared for the use of all railways.

I. S. Fairty, Toronto, stated that he was opposed to too many boulevard stops or similar restrictions. He also opposes licenses for motorists. Street cars should be given the right-of-way over vehicles he said.

The standards committee, D. E. Blair chairman, reported on the progress of electric railway standardization in Canada, and the co-operation between this association and other bodies in the United States and Canada.

Valuation and Depreciation

The committee on valuation and depreciation, H. E. Weyman, general manager Levis County Railway, chairman, presented a report recommending the Interstate Commerce Commission standard classification of accounts for electric railways, including the sub-accounts covering motor vehicle operation as adopted at the 1924 convention of the American Electric Railway Accountants' Association.

On the subject of depreciation the committee stated that there are numerous features to be given consideration in connection with the depreciation of electric railway accounts. Two classifications of depreciable property are recognized: Property that must be replaced in the form of individual units, such as cars, buildings, etc., and property whose replacement is a more or less continous process, such as track. The straight-line method of figuring depreciation charges was recommended, and it was recommended that a minimum cost figure should be set below which the book value of the part should not be depreciated. Obsolescence was considered separately from true depreciation, and it was the sense of the committee that this item might well be amortized in future years, since the replacement of the part was on account of the more efficient or more satisfactory service to be rendered by the new part.

Track Welding Discussed

A paper was read by A. T. Spencer, Toronto, describing the results obtained from welding of track joints on the lines of the Toronto Transportation Commission. His paper is abstracted elsewhere in this issue. A lively discussion followed, which was taken part in by many of the members. J. B. Tinnon, Metal and Thermit Company, New York, emphasized the necessity of watching the joints and taking care of them before the development of serious trouble. He spoke briefly of the tests now being made under the auspicies of the American Electric Railway Engineering Association way committee.

Attention was called to the lack of unanimity of opinion of way engineers regarding methods for seam welding joints by E. B. Entwisle, Lorain Steel Company, Johnstown, Pa. He recommended post-heating of any type of joint to anneal the metal. R. M. Dominey, Windsor, who has used both carbon and metallic arc welding, gave some of his experiences in track welding. C. B. King, London, Ont., stressed the necessity of making a continuous rail. He described experiments he had made using base plates, but with steel rods welded to the web of the rail in place of joint plates. By filling the gap between the rail ends an arch effect is produced, he stated, that makes the joint rigid. Mr. Tinnon called attention to the difficulty with deposited metal of getting the same composition to fill such a gap as there is in the body of the rail. A special form of joint plate is preferred by H. E. Weyman, Levis, Que., for use with old rail in order to get the correct alignment of the butting rails.

Mr. Blair spoke of the welding of the 60-lb. or 70-lb. A.S.C.E. section rail in Montreal in 1918, which was done with the carbon arc process with loosely fitted joint plates and base plates, seam welded. This type of joint has been found very satisfactory in practice, not a break having occurred on some 2½ miles of track.

Questioned regarding expansion joints, Mr. Spencer stated that in Toronto he has left an open joint for expansion about every 1,500 ft. of straight track. Special work and curves are not welded. He also stated that he has had some measure of success in the welding of manganese steel.

A paper was read by A. H. Foster,

Brantford, describing some of the problems of street railway operation in a medium sized city. This paper is abstracted elsewhere in this issue. Discussing the paper, Mr. Robertson mentioned the combination of pay-as-you-enter fare collection inbound combined with pay-as-you-leave outbound as a method of simplifying operation and reducing congestion. He also called attention to the advantages of cars designed for modern operation, mentioning the new car designed for the Hydro-Electric Railways. This car, weighing about 26,000 lb., has an energy consumption of about 1.4 kw.-hr. per car-mile.

R. M. Reade, Quebec, stated that for the assistance of one-man operators he has put tickets on sale at various agencies, such as cigar stores. These tickets are sold outright to the agencies in bulk at a discount of 5 per cent, so that no risk is involved to the railway. With this assistance in fare collection the one-man cars have been able to make the same speed as two-man cars.

Mr. Weyman feels that the logical cash fare is 10 cents, with reduced rate tickets arranged to take care of any reductions that are desirable. On his line these are now selling at four for 30 cents. This rate, he said, is not liked by the public, the men or the company. He feels that tickets should be sold in such units as can be handled easily, such as 25 cents or 50 cents. The 10-cent fare does not affect the regular rider, who uses tickets exclusively. Fares are accounted for by means of registers, and the register reading must agree with the fare box collections within 4 per cent. If the discrepancy is greater than that the operator must return the difference.

To cut down service loses traffic, according to Mr. Weyman. Of the total operating expenses, 70 per cent are fixed when one-man cars are used, regardless of the number of cars actually in service, up to the limit of the number owned. On a small property the car-mile is not a reliable basis for comparison on account of the large proportion of the charges which are fixed in amount.

His road formerly purchased several types of second hand cars from time to time. The amount of repair stock it was necessary to keep on hand was very great. Fortunately a fire enabled him to standardize on new equipment, so that he has been able to introduce operating economies and reduce the amount of stock.

Leonard Tait, London, Ont., stated that his company has discarded the register and is weighing the tickets instead of counting them.

H. K. McLean, St. John, N. B., gave his experience with the weekly pass, which he thinks has increased the riding in St. John. This pass is sold on Mondays for $1, and is good for the week. Tickets also are sold at the rates of three for 25 cents, or 14 for $1. The receipts are now running about 10 per cent cash, 14 per cent tickets, and the remainder are riders on the passes.

Mr. Robertson stated that he is not using a register, and also is weighing the tickets instead of counting them. For the conductors' returns he has designed a special safe which is installed in the partition between the conductors' room and the accounting office. It has 24 separate compartments, one being assigned to each conductor. The conductor's turn-in is placed in one of the compartments, which is then closed and locked automatically. It can be opened by means of a combination in the accounting office, the contents removed and the outer door reset.

In Ottawa the paving charges are assessed against the property owners, according to Major F. D. Burpee. This has been found very desirable in the business district, as the stores are benefited by the presence of the street railway. In the residence districts the advantage to the property owner is not so obvious.

The reports on motor vehicle operation and on valuation and depreciation were carried over for another year.

THE NEW OFFICERS

The following officers were elected for the ensuing year:

Honorary president, Lt.-Col. J. E. Hutcheson, general manager Montreal Tramways.

Honorary vice-president, Acton Burrows, proprietor *Canadian Railway* and *Marine World.*

Honorary advisory council: T. Ahearn, Ottawa; F. A. Gaby, Toronto; S. J. Hungerford, Montreal; George Kidd, Vancouver.

President, D. E. Blair, superintendent of rolling stock Montreal Tramways.

Vice-president, W. S. Hart, treasurer Quebec Railway, Light, Heat & Power Company and vice-president Three Rivers Traction Company.

Treasurer, E. P. Coleman, general manager Dominion Power & Transmission Company.

Auditor, C. B. King, manager London Street Railway.

Executive committee: The president, the vice-president, the treasurer, the immediate past-president (F. D. Burpee, Ottawa) and A. H. Foster, Brantford; G. Gordon Gale, Hull; D. W. Harvey, Toronto; D. W. Houston, Regina; M. W. Kirkwood, Galt, Ont.; A. W. McLimont, Winnipeg; M. A. Pooler, St. John, N. B.; W. R. Robertson, Toronto; H. E. Weyman, Levis; C. L. Wilson, Toronto.

JOINT LUNCHEONS HELD WITH ELECTRICAL ASSOCIATION

At the joint luncheons, which were held Wednesday, Thursday and Friday, a series of talks of interest both to the railway men and the electrical men were given. The first luncheon was presided over by G. Gordon Gale, vice-president Hull Electric Company. He introduced Mayor Napoleon Champagne of Ottawa, who gave an address of welcome. Following this there was a witty talk by Col. H. C. Osborne, who paid a striking tribute to the services of the engineers in the improvements that have been effected in the utility field through their efforts.

The Thursday luncheon was presided over jointly by P. T. Davies, president Canadian Electrical Association, and Mr. Blair. The speakers were H. T. Sands, vice-president National Electric Light Association, who spoke on public relations, and James W. Welsh, executive secretary American Electric Railway Association, who pointed out that traffic congestion in the larger cities is the greatest obstacle to street transportation. The electric railway industry must not be stampeded by the motor bus, he said, but must make public transportation more popular and private transportation less so by comparison. The electric railway should be the carrier of the people, and should keep a firm hold on the transportation business.

On Friday the speakers at the luncheon were George Oxley of the National Electric Light Association and Morris Buck, associate editor ELECTRIC RAILWAY JOURNAL. Mr. Buck spoke of the campaign of modernization which is now well under way in the United States and the work being done along these lines by the American Electric Railway Association and the technical press.

Thursday evening the delegates were guests at a dinner held at the Chaudiere Golf Club. The toast to the King was proposed by the joint toastmasters, Messrs. Blair and Davies, and responded to by the entire assemblage. Following this was a toast to "Our Guests," proposed by Major Burpee and responded to by the Hon. George P. Graham and P. D. Zimmerman of the N.E.L.A. "The Ladies" was proposed by Mr. Blair and responded to by Don M. Campbell. The final toast, "The Technical Press," was proposed by Col. D. R. Street and responded to by Acton Burrows, *Canadian Railway and Marine World,* and Dr. Walter Carr, *Electrical News.*

EXHIBITS A FEATURE

The exhibits this year were if anything better than those at the convention last year. Every space was filled and there were several outdoor exhibits of buses and the new one-man car of the Hydro-Electric Railways built by the Ottawa Car Manufacturing Company.

Among the exhibitors were: Don M. Campbell, Preston, Ont.; Canada Street Car Advertising Company, Montreal; Canadian Car and Foundry Company, Montreal; Canadian Cleveland Fare Box Company, Preston, Ont.; Canadian General Electric Company, Toronto; Canadian National Carbon Company, Toronto; Canadian National Safety League, Toronto; Canadian Porcelain Company, Hamilton, Ont.; *Canadian Railway and Marine World,* Toronto; Canadian Steel Foundries, Montreal; Canadian Westinghouse Company, Hamilton, Ont.; Cheatham Electric Switching Device Company, Louisville, Ky.; Crouse-Hinds Company of Canada, Toronto; Differential Car Company, Findlay, Ohio; Dominion Insulator & Manufacturing Company, Toronto; W. L. Donnelly, Ottawa; Economy Electric Devices Company, Chicago, Ill.; ELECTRIC RAILWAY JOURNAL, New York; *Electric Traction,* Chicago, Ill.; *Electrical News,* Toronto; *Electrical World,* New York; Ferranti Meter & Transformer Company, Toronto; Galena Signal Oil Company,

Toronto; Inventions, Limited, Montreal; Lincoln Meter Company, Toronto; Lyman Tube & Supply Company, Montreal; Metal & Thermit Corporation, Toronto; Nachod Signal Company, Louisville, Ky.; Northern Electric Company, Ottawa; Ottawa Car Manufacturing Company, Ottawa; Railway & Power Engineering Corporation, Toronto; Reo Motors (Capital Motors), Ottawa; Sangamo Electric Company, Toronto; Sarnia Bridge Company, Sarnia, Ont.; the N. Slater Company, Hamilton, Ont.; Southam Press, Montreal; Spielman Agencies, Montreal; United States Steel Products Company, Montreal; the White Company, Toronto.

Welded Rail Joint Practice in Toronto*

How the Transportation Commission Has Welded 17,500 Joints in Two Seasons of Track Construction

By A. T. Spencer
Assistant to General Manager Toronto Transportation Commission

SINCE 1921 there have been welded on the tracks of the Toronto Transportation Commission about 17,500 joints, of which about 11,000 were in connection with new track construction and 6,500 in reclaiming joints on track which has been in service a number of years. The work done covers joints on 122-lb. grooved girder rail, 90-lb. grooved girder rail, 80-lb., 7-in. high T-rail and 100-lb. A.R.A. type "A" T-rail. Of the 11,000 joints welded on new work there have been no failures. Five or six joints, where old standard plates were used on old track, have failed. No failures have occurred on old track where new plates have been used.

Because of the amount of track rehabilitation and extensions which was done in 1921-22, the equipment owned by the commission is, of course, much more extensive than would normally be the case. It consists of:

1. Six machines of the dynamotor type mounted on road wheels. These are used chiefly for joint welding with the carbon arc.

2. Three metallic arc machines used chiefly for welding steel bond terminals. A very successful job of joint welding can be made with these machines, though the speed of welding is considerably lower than with the carbon arc. Tests carried out at the University of Toronto showed that as far as conductivity and strength were concerned the metallic arc produced just as strong a joint as the carbon arc.

3. One Burke welding outfit consisting of a Burke welding machine mounted on an old single-truck passenger car. It is of the dynamotor type and is connected for two operators. It is used chiefly for building up special track and cupped rail joints at night.

Five kinds of welding rods are commonly used, as follows:

1. $\frac{5}{32}$-in. diameter bare low carbon rod with carbon content of 0.16 per cent used in metallic arc welding of drain plates, joint plates and building up cupped rail.

2. $\frac{5}{32}$-in. diameter bare high carbon rod with carbon content of 0.58 per cent used for metallic arc welding of cupped and worn rails.

3. $\frac{5}{32}$-in. diameter flux coated, low carbon rod with carbon content of 0.28 per cent used for metallic arc welding of steel terminal bonds.

4. $\frac{5}{32}$-in. diameter bare low carbon rod, with carbon content about 0.10 per cent. These are standard electrodes for joint welding with the carbon arc and are also used in welding track drain plates and heavy welding repairs to steel castings or forgings.

5. $\frac{5}{16}$-in. diameter coated manganese rod, known as Wanamaker rod, manganese content of about 14 per cent, used for repairing and building up manganese special track work.

In all welding, with the exception of building up manganese steel special work, the rail is positive.

The joint plates used in most cases have been 24 in. long of $\frac{7}{16}$-in. mild steel, with carbon content of 0.25 per cent to 0.35 per cent, and are planed to fit accurately the fishing surfaces of the rail section. Four bolt holes are punched, this operation being done before the plates are planed, as otherwise humped joints or concave joints will result because of uneven fishing surfaces.

It is generally accepted that welding to the base of the rail should not be done where the base is less than $\frac{3}{8}$ in. thick. In 1923 a number of joints were installed, using a $1\frac{1}{8}$-in. plate with the base chamfered so that the base weld would be set inward to where the rail base was the required thickness. Angle bar plates and continuous joint plates have also been used with good success by shearing off the base of the plate, but the writer believes that new planed plates will give the best results.

Considerable argument has arisen regarding the length of weld required and its location on the seams in order to give the strongest and most satisfactory joint. As this is now one of the matters under test, the writer will not express an opinion except to say that tests made in Toronto indicate that, in order to produce 100 per cent conductivity in the 122-lb. rail section, it is required to have four seams of from 20 to 22 in. long.

It is considered important that the welding on opposite seams should not end or begin opposite each other.

The use of the defining bar was discarded after a sufficient number of operators had been thoroughly trained. The hand-feed method is used, whereby the operator controls the arc with the welding handle in his right hand and feeds in the welding rod with the left hand. This was found to be the most satisfactory method both as to speed and quality of the weld.

In laying the track, the track gang is responsible that the fishing surfaces of both rail and plates are clean and free from rust before being bolted up, and the track at the joint is properly lined and surfaced before the welders begin work. The plates are drawn up tightly with four bolts and the welders are instructed not to begin their work if the joint is not correct as to line and surface. The joint surfaces will not always be found to be correct. Where the surface is good the order of welding is as follows: (1) Inside bottom seam; (2) outside bottom seam; (3) inside top seam; (4) outside top seam.

On concave joints the above order is followed, but the two top seams are tacked with spot welds each side of the rail joint after the bottom seams are welded. If the joint is found to be slightly convex, or where the surface is good but the rail noticeably undercut, the order is changed and work done as follows: (1) Outside top seam; (2) inside top seam; (3) outside bottom seam; (4) inside bottom seam.

Using from 175 to 200 amp. at 50 volts, the penetration secured is about $\frac{1}{8}$ in. deep in plate and rail. By holding this current the welds obtained have proved stronger and more ductile than welds made with a higher current and deeper penetration.

The speed of welding is about 2 in. of seam per minute. On an average the speed secured over a day, including moving of machines and incidental details, is one to one and a quarter joints per hour.

After welding, the seams are brushed and the whole joint painted, after it has cooled, with water-proof black paint to prevent corrosion of the welded metal.

It is important that the rail surfaces at the joints be ground as soon as possible after welding and before car service is operated.

The allowable variation in rolling rail section at the mill is such that seldom will two new rails match perfectly. Sometimes even after rails are carefully ground to a true surface, car traffic will show that the work has not been done properly.

The writer believes that no type of welding or mechanical joint under service will insure entire freedom from cupping and that all types of joints must be watched. Should the receiving rail show signs of polishing it is almost certain that cupping will occur later, which, if not attended to in the early stage, may develop serious failure of the joint.

The writer also believes it is too often assumed, when a series of joints is completed, that all can be forgotten for some time, and he knows of no better example of when "a stitch in time can save nine" than in the careful watching and, when necessary, the giving of slight grinding attention to a polished receiving rail at the joint.

Regarding costs of seam-welded joints, it will be found that in the type of joint above described about 2 lb. of welding rod will be used per joint and that, including this and covering a series of joints, the cost of each, exclusive of plates, will average about $1.80 per joint, including moy-

*Abstract of a paper at the convention of the Canadian Electric Railway Association, Ottawa, June 11-13, 1924.

ing of machines and delays, with operator's wages at 65 cents per hour.

In none of the joint welding done in Toronto has the rail been preheated before welding. It is interesting to note in connection with one set of joints sent to Washington for test by the American Bureau of Welding—and which was preheated before welding—that when subjected to the bending tests the joint apparently could not be completely destroyed, though perhaps in other respects it did not show up any better than other types of joints.

Problems of a Railway in a Medium Sized City*

Some of the Essentials that Will Help Make for Successful Operation in the Face of High Costs—Inducing the Public to Ride

By A. H. Foster
Manager Brantford Municipal Railway, Brantford, Ont.

THE small roads must look upon the large ones as their big brothers, and religiously consult the technical journals and railway associations for information concerning improved practices if they wish to run their properties as they should be run. I do not mean that all the good ideas emanate from the large properties, as I believe that as much adaptability and resourcefulness exist on the smaller roads.

Much depends on a proper roadbed. It is the first step in good railway operation. It will permit of higher car speed, lower maintenance costs to both track and rolling stock, smoothness and comfort in riding. I do not mean that it is necessary to indulge in the more expensive classes of construction or the heavy section rails now available, but I do mean the track construction should follow the best accepted practices, such as will fit the purse of the railway and meet the requirements of the rolling stock and possible volume of traffic. While there is much diversity of opinion as to the desirability of steel ties and monolithic construction in trackwork, I think the smaller roads, particularly, when required to lay permanent pavements will secure good results by the use of this type of construction. Some of the steel ties on the market secure their bearing practically under the base of the rail and for this reason will reduce the initial cost by thousands of dollars per mile over other classes of construction on account of the reduction in the amount of excavation and concrete required.

Under most conditions an 80-lb. rail is ample, an A.S.C.E. section for gravel or ballast construction and a high section rail for paved or permanent roadway construction. In most of our roads the wear on the rail itself has in the past not been the determining factor in the life of the track, but rather joint conditions have been the cause of failure. For this reason rails with a length of 62 ft. should be used, the extra cost over the shorter lengths being offset to a great extent by the reduction in the cost of splice bars, bolts, bonds, welding, etc.

A large part of track troubles are due to joint conditions. No reasonable expense should be spared and close attention should be given to this important item of track construction and maintenance. Most of the trouble originates in the loosening of the bolts in the splice bars, caused by improper fitting of the plates or perhaps by failure of the bolts themselves. There can now be purchased in Canada or the United States heat-treated bolts with tensile strength and elastic limit nearly double those of the ordinary low carbon bolt, and they should be used exclusively for railway work.

The electric welding of joints is now past the experimental stage and will prevent to a great extent the troubles usually met with. I think that no road is so small that the use of this type of rail jointing cannot be justified. Rail joints should also be ground so as to present an absolutely true running surface, which will prevent the battering and cupping of rail ends.

Curves are often laid by rule of thumb and to the requirements of gage only. This is a mistake, as much discomfort in travel, damage to rolling stock, and slowness of car movement can be avoided by properly laid out and spiraled curves.

Where car routes diverge, we have installed electric switches, and spring switches have been installed at turnouts so that our operators are not required to stop or leave the car. There has always been a dislike on the part of carmen to either stopping their cars to get out to turn switches, particularly if weather conditions are bad, or performing contortions with a switch rod through a hole in the floor.

While steel poles may be desirable, their cost usually prohibits their use except in the business sections. In Brantford we install cedar poles slightly longer than are actually required by the railway, leaving the upper portion available for our power and lighting utilities, which pay for this privilege.

Traffic Conditions and Requirements

In the smaller cities, street car riding may be in part due to necessity, but usually it is one of convenience and habit. All railways must cater to the short-haul rider, but the small properties almost entirely on this class of business. In most cities of say 50,000 population or under, a more frequent service is usually provided than can be justified by the traffic. Regularity is essential or otherwise patrons will walk.

It is not always possible to increase the average speed of our cars in keeping with the less congested thoroughfares encountered in the smaller cities, many of which give a 10-minute, or less frequent, service. This is caused by a variety of reasons. Stopping places have to be established at frequent intervals to encourage and accommodate short-haul passengers. Usually there exist considerable stretches of single track, operated with turnouts, making the movement of one car dependent on that of another. On account of the comparatively infrequent service it is necessary to establish transfer points where positive connections must be made.

A regular and easily remembered schedule is more efficient than an irregular one, although with closer headways. In other words a 10-minute service to meet all conditions is more profitable than a 9-minute or even an 8-minute schedule that might vary from time to time.

One-Man Cars a Necessity

In the class of cities I am referring to a service with reasonable headways can best be rendered by means of light-weight one-man cars. I am of the opinion that any conditions that permit of the use of small light-weight cars also will permit of one-man operation.

As to the safety of one-man car operation, during the past year, with an operation of more than half a million car-miles, we did not pay one cent for personal injuries and less than $100 for damage or collision claims.

Ticket Fares Desirable

On the rate of fare depends to a considerable extent the volume of business, and hence the amount of revenue. In the smaller cities there are greater limitations as to the amount which can be charged, as riding is not a necessity to a large percentage of the population. As a comparison in regard to the riding habit, the following figures are given:

City	Population	Revenue Passengers per Capita per Annum
Cornwall	7,382	88.0
Sarnia	14,637	79.0
Guelph	18,019	72.7
Kingston	23,954	36.8
Kitchener and Waterloo	27,491	93.5
Brantford	29,395	109.3
London	59,100	212.3
Hamilton	108,143	177.2
Providence	237,595	227.0
Indianapolis	314,194	272.0
Toronto	538,771	354.0
Cleveland	796,836	367.0

In this section of the country a 6-cent fare is about the limit that can be charged, as a larger fare would result in a reduction of traffic sufficient to offset the increased revenue from the larger rate. In Brantford, where a 6-cent cash fare is charged, more than 75 per cent of our riders use tickets, which may be purchased in multiples of 10 at the 5-cent rate, and we find that only transients or casual riders pay the cash fare. The benefits of tickets we believe are considerable,

*Abstract of a paper at the convention of the Canadian Electric Railway Association, Ottawa, June 11-13, 1924.

as persons in possession of tickets already paid for will ride much more frequently than the cash rider. Particularly in one-man car operation the use of tickets is desirable as it facilitates the work of the operator, who is required to make a money transaction for only every 10 rides or more.

Delays Occasioned by Making Change

Even with a small ratio of cash riders, we considered the delay in making change of sufficient importance to give some thought to the matter, and if possible reduce the delay to a minimum. A 6 or 7-cent fare required that in making change five coppers were always necessary and we felt that any method that would lessen the operation of counting these five coins would be a step in the right direction. We found that there were on the market certain types of what have been termed "high-speed changers," that are inexpensive, light, portable and accurate and that any required number of certain coins could be ejected by a single operation without actual count and which could be adjusted to meet any usual requirements.

Equipment Maintenance a Serious Problem

Maintenance is a serious problem on a small road. With the large variety of work to be done, the volume does not permit of the employment of men whose duties are confined to one or two operations, but rather these men must be familiar with, and perform more or less individually, many classes of repair and maintenance work.

Usually the smaller the road the less spare rolling stock is available, and crippled cars must be placed back into service in the minimum time. To accomplish this, shop equipment must be chosen carefully, and although a large variety may not be justified, every shop should have at least a fair-sized lathe, a good drill, power hacksaw, shaper, pipe and bolt-threading machine, grinders, pit pump, blacksmith shop and crane, as even with local machine shops available for repairs, the cost and delay in getting work done prohibit their use to a great extent.

In the small shop many hundreds of dollars may be thrown away via the scrap pile, on account of the inability to repair broken or worn material. I know of no equipment that will assist more in lessening this waste than an oxyacetylene cutting and welding out fit and an electric welder suitable for shop and track use.

In certain cases, co-operation between railways not too widely separated as to distance will prove to be of value. I have in mind the Brantford and the Kitchener street railways, neither of whose operations would perhaps permit of the purchase of portable crossovers, so it was decided that one property would buy a left-hand and the other the right-hand turnout, and that work being done that would require their use should be laid out so as not to conflict.

Careful watching of the stores will result in appreciable savings for any electric railway. Usually the small or medium-sized roads have a comparatively large variety of rolling stock. Car purchases are made infrequently and standardization is sacrificed by the railway for the newer types of equipment. Frequently second-hand cars may be purchased with cheapness as the main consideration. A comparatively large variety of repair parts must be kept on hand and stocks must be kept at a minimum so as to not tie up a considerable amount of money, and that in the event of discarding or scrapping equipment, large losses will not be incurred by disposing of store supplies. Properties with much of the older styles of equipment find that in the event of materials on hand becoming exhausted great delay will be experienced in deliveries with attendant inconvenience.

As a general remark in closing, I would say that no efforts should be spared to have neat, well-informed, and courteous car operators, and clean, well-ventilated and well-heated cars if the good will of the public is to be retained, which is absolutely necessary if the railway is to be a success.

Midwest Association Has Lively Convention

Transportation Salesmanship, Taxation, Bus Operation and Traffic Problems Were Topics of a Well-Balanced Program of General Interest—Courage and Co-operation Urged by Railway Commissioner

"ANYTHING is possible when we have to do it. And your industry has reached the crisis in its career when the 'must' of the situation has become the dominant note. The public, whether it realizes it or not, must have street car service. It must be educated to that fact. You who are in the business must find ways and means of giving that service. . . . That genius for overcoming obstacles that has been a characteristic of American progress will find a way in your industry."

In these words, H. G. Taylor, member of the Nebraska State Railway Commission, and president of the National Association of Railway and Utility Commissioners, voiced the spirit that must dominate the thinking of the railway executive of the day. The statement was made in his address, printed elsewhere in this issue, delivered at the banquet concluding the first annual meeting of the Midwest Electric Railway Association, held in Omaha, Neb., on June 11 and 12.

Commissioner Taylor's address was a fitting climax to a meeting punctuated throughout by positive and progressive statements. In a paper presented at the first day's session F. G. Buffe, general manager for the receivers, Kansas City Railways, expressed the modern railway executive's creed of continuous and uninterrupted service. His paper is abstracted elsewhere in this issue. As a result of this same attitude manifested throughout the meeting, a spirit of optimism permeated all of the discussion.

Mayor J. C. Dahlman of Omaha welcomed the members of the association to the city on Wednesday morning. He said that transportation is one of the most important problems of the cities and the entire country and that faith, sound judgment and determination were required to cope with it.

St. Louis Traffic Problems

Taking "Traffic and Congestion" as his topic, R. J. Lockwood, assistant manager for the receiver, United Railways of St. Louis, described some of the traffic problems and the work for the relief of street congestion that has been done in that city. He pointed out the advantages to the riding public and to the railway of the widening of Twelfth Boulevard, which has permitted a track relocation eliminating six right angles and five blocks of route. The new traffic ordinance passed there last March confers on the traffic council power to regulate parking, establish safety zones, and to control traffic.

To give an idea of the St. Louis problem, Mr. Lockwood pointed out that the city proper has an area of 61.4 square miles, with 950 miles of streets. The population is 803,000, and St. Louis County has an additional population of 107,000, mostly adjacent to and commercially a part of the city. The towns in Illinois just across the Mississippi, with some 91,000 people, make a total metropolitan population of about a million people. Street railway service in the city and county is furnished by the United Railways, which has 37 car routes covering 483 miles of tracks. It operates daily 1,412 cars and handles a million and a quarter total passengers.

The principal traffic problem in St. Louis, said the speaker, is in the central business district, about one-half mile square. The streets in this area have roadways of 30, 36 and 50 ft., only three being of the latter width.

The population within the corporate limits of the city has increased approximately 40 per cent in 23 years, while the street car traffic has increased 109 per cent in the same period. As 80 per cent of all street cars terminate or pass through the congested district, an idea of the effect of increased street car travel on the traffic may be gathered.

The recent and acute factor in traffic congestion is the automobile. In 1917 there were 24,301 licensed automobiles in St. Louis; in 1918, 27,496; in 1919, 37,414; in 1920, 53,230; in 1921, 69,433, and in 1923 slightly more than 120,000. This is an increase in six years of approximately 400 per cent. Now there is an automobile for every 6⅔ people, as compared with one for every 30⅔ in 1917.

Another recent addition to traffic congestion is the bus, of which 72 are operating at present on four routes aggregating 20 street miles. About 80 per cent of this is on streets with street cars, and all four routes penetrate the

congested district on Washington Boulevard between Twelfth Boulevard and Third Street.

In November, 1922, the department of streets and sewers checked the traffic entering and leaving the congested district on 39 arteries of travel for the 11-hour period from 7:30 a.m. to 6:30 p.m., and found the following conditions:

	Number	Per Cent of Vehicles	Per Cent of Passengers Carried
Street cars ..	12,342	10	68
Automobiles ..	69,509	59	25
Trucks and wagons	36,729	31	7

The total movement was 118,580 vehicles, or an average of 10,780 per hour.

The large number of automobiles for the number of people they carry is not their only serious contribution to street congestion. Harland Bartholomew, city plan engineer, estimates that in the congested district the streets afford parking space for only about 2,500 cars. When this space is filled the street area available for traffic movements is reduced 36 per cent.

The effect of the increased congestion just described on street car service has been to reduce the average schedule speed about 1½ per cent since 1917 and to increase street car-automobile collisions 17 per cent in the same period. Especially during the hours of greatest demand the street cars are getting behind schedule. Checks show that in a distance of some 1¼ miles on Washington Boulevard the cars are losing about 8 minutes, and for a like distance on Olive Street the cars are losing about 16 minutes.

The first order of the traffic council was to prohibit parking on Olive Street from Twelfth to Fourth Street and around the Olive car loop, except commercial vehicles, for a period of 15 minutes. The effect of this has been to speed up the Olive Street cars 33⅓ per cent in the congested district and materially to reduce the peak-hour delays.

The speaker stated that he agrees with Mr. Bartholomew in the statement:* "The provision of parking space in city streets is not a public obligation. The parked vehicle must give way to the moving vehicle." By eliminating parking during the peak hours more than 50 per cent additional roadway would be available for moving traffic, the moving automobile traffic would be reduced about 25 per cent and the street cars would be required to handle only about 2 per cent more passengers.

The speaker also agreed with Mr. Bartholomew's conclusion that expensive street rearrangements or subway construction do not in themselves constitute a solution of street congestion. One mile of subway construction in the congested district of Boston cost some $8,000,000, and the St. Louis street car traffic does not justify such an expense.

The street improvement plan was indorsed by Mr. Lockwood. Recently St. Louis voted $87,000,000 for civic improvements, of which $12,000,000, augmented by $8,000,000 secured by assessment against surrounding property, is to be devoted to street widening and other traffic changes. To fit the tracks to these changes will cost the United Railways approximately $1,500,000. The program will take ten years to complete, but when it is through there will be a system of major streets that, with proper traffic regulations, will improve conditions greatly.

*ELECTRIC RAILWAY JOURNAL, March 8, 1924, page 366.

ECONOMIC FACTORS IN CITY

Some of the more important economic features affecting street railway transportation were discussed in a paper by E. A. West, superintendent and chief engineer Denver Tramway. He stated that the time has come when railway managements must speak out and present their views frankly in discussing the many questions affecting the industry. He pointed to the dangerous congestion due to the crowding of the business districts of American cities, and stated that it is rapid transit of the masses by the electric railway that has made our cities possible. Certainly there is no other means of transportation in sight to supplant it.

The development of new suburban districts by electric railway extensions is no longer possible, as the automobile has introduced an element of uncertainty into the problem, making it necessary for the railway to wait until the territory is built up before extending into it.

The politician and promoter types of manager are gone, in Mr. West's opinion. In their place we have earnest individuals who are striving to give efficient service, recognizing that this is the only sound basis for the industry to work on. An awakened public conscience is making it harder for a certain type of politician and newspaper to use local public utilities for footballs.

While the street railway is a natural monopoly, there are many forms of competition, including the bicycle, the low-price taxicab, and the jitney. But the most disastrous form of competition the railways are up against is the private automobile. This will never be done away with, according to the speaker. Its effect can only be reduced by better service, by increased speed, by courteous, considerate treatment of the passenger, combined with the high cost of automobile operation.

The importance of good public relations was stressed by the speaker. Adherence to schedules, clean and well-painted equipment, good ventilation and heating, and good seating arrangements and lighting are advocated as means of furthering this.

In introducing new equipment, he felt that it should conform in general appearance with the old, as the general type of car has become known, and the patrons of the lines not favored with the new style cars will charge the company with discrimination. Cars can be remodeled and new cars can be added embodying the latest features of mechanical and electrical equipment and arouse no dissatisfaction, when the general outward style is retained.

It is beginning to look as if the automobile problem will take care of itself, according to the speaker. It is reported that already in some cities automobile owners are beginning to leave their cars at home and go back to the street cars. However, there is one phase of this auto situation that all of us must watch. As the situation now exists our peaks morning and evening are soaring higher and our valleys are going lower, and as you know, economically the cost of peak-load transportation is the highest because of the investment in power, rolling stock and buildings needed for peak requirements.

In considering the traffic congestion problem, in spite of all that has been said to the contrary, this matter can be introduced more smoothly, if solved by interests outside the street railway. It is a grave mistake, in Mr. West's opinion, for the management to take the lead in solving it. No doubt the street car company experts should be consulted, and without question will be called in to help out in the matter before anything final is decided. If the management is popular in a town, then it will be asked to participate in the traffic congestion study. If not popular, it won't be asked; and forcing a way in will make matters worse. We are concerned in the traffic problem, but perhaps not as much so as we think. These figures for Denver illustrate this:

AREA OF DENVER DOWNTOWN STREETS IN PER CENT	
Devoted to parked automobiles.....	22.8
Devoted to street car traffic.....	1.4
Available for automobile traffic.....	75.8

In the discussion which followed Mr. Lockwood compared the relative value of all-day parking prohibition with rush-hour restrictions only. P. H. Conroy said that none of the business streets in the average American city had ever been intended to carry the automobile traffic of the present day.

A careful distinction between economics and economies was urged by S. B. Irelan, vice-president and general manager St. Joseph Railway, Light, Heat & Power Company. Too much attention, he said, has been given by utility men to methods of making economies, and too little to the broader question of the economic value of more convenient, frequent and comfortable service with a rate of fare sufficient to provide such service.

F. G. Buffe said that there are many indications that the automobile problem is solving itself. This was held to be particularly true in the larger cities. Americans are notorious in going to extremes in any wave of development, and the wave of automobile use is even now beginning to recede, he claimed. As a result of the expense and danger of the automobile many who have been using it as an everyday convenience will again be excellent prospects as street car customers, provided that modernization of equipment and improvement in service have in the meantime made the street car ride sufficiently attractive.

Mr. West illustrated the results which could be accomplished by selecting the proper equipment for cars by citing the increased schedule speeds made in Denver. Schedule speeds prior to 1923 in that city averaged 9.7 m.p.h. including all dead time, layovers, etc.,

and also including trailer operation. As a result of increasing the acceleration, and with little increase in the free running speed, the schedules were increased to 10.5 m.p.h.

Field of the Bus

"The Bus and Its Place" was the subject of a paper by Bruce Cameron, general manager for the receiver, Joplin & Pittsburg Railway, Pittsburg, Kan. He pointed out the difficulties and large expenses of constructing a new railway, as compared with the ease of establishing a bus line. The place of the bus, he said, is (1) in sparsely settled communities; (2) in new territory yet unable to support a car line; (3) on streets where there are no car lines, and yet where the car lines are near enough that new lines would not pay; (4) in large city parks where there are no car lines; (5) as miscellaneous feeders to existing car lines, where service is needed at certain hours or in certain periods of the year only. In all such cases he believes the buses should be operated or controlled by the railway in such a manner as to avoid duplication of service.

The interurban situation is quite similar, according to Mr. Cameron. There are communities that are built up around industries of short duration, that would not warrant the construction of rail lines. Also for pioneer work where there are no interurbans the bus can be used during an experimental period to determine whether railways will pay. Then, too, there certainly is a field for the bus as a feeder to interurban railways, he said.

An independent bus operator should not be permitted to operate along the same route on a city street as the car line, neither should a bus line be permitted to operate on a hard surface road paralleling an interurban line, for the simple reason that it is not sound economically—it destroys capital and is a repetition of service, to the end that neither makes any money—therefore, cannot exist.

Without question, buses are here to stay. They are operating and people are riding in them and will continue to do so. They should be taxed equally with the railroad, and pay their part of the expense, and should not be permitted to operate without certificates of convenience and necessity, and under the regulatory bodies, the same as the railroad, and then and in that case a few years will tell us what the traveling public wants—rail or rubber, and until this is settled both systems of transportation, with rare exceptions, will continue to lose money.

In the discussion, Mr. Buffe said that there was no question of the usefulness of the bus under certain conditions for feeder or auxiliary service, but that the application of this form of transportation must be approached as an individual problem for each community or district under consideration.

Mr. Irelan said that the operation of buses by electric railways may be expected to raise a question of a common fare for both buses and street cars with transfers between them. In addition, he said that when the railways begin to operate buses in conjunction with the rail lines, the question of paving costs soon comes up and there is a tendency to demand that the railway pay the cost of paving. Mr. Campbell discussed the advisability of cooperating with independent buses by allowing them to use existing railway terminals so as to make them feeders to the interurban lines.

The A.E.R.A. Modernization Program

R. F. Carbutt, railway engineer H. L. Doherty & Company, New York, and regional vice-chairman of the committee on city operation of the American Electric Railway Association, prefaced his paper on "Bringing the Latest and Best to Railway Men" by saying that the industry is coming back only in spots, here and there, because many properties do not make use of the modern and efficient methods which are developed on individual properties. Mr. Carbutt's paper is abstracted elsewhere in this issue.

The street railway industry is today burdened with indirect taxation amounting to around 10 per cent of the gross, is the conclusion of S. B. Irelan, vice-president and general manager St. Joseph Railway & Light Company, St. Joseph, Mo., in a paper on "The Indirect Tax and the Street Car Ride." In addition to the federal, state and local taxes that are paid by all corporations and individuals, public utilities are perhaps taxed heavier under this form of tax than any other class, said the speaker, as in the past the utility business has been considered very prosperous.

There are in addition a number of special taxes on utilities and on street railways in particular, such as taxes on intangibles, franchises or easements, gross receipts and net receipts. These are in addition to the taxes levied on other business, corporations and individuals.

Other indirect taxes consist of many service burdens; paving construction, repairs and maintenance; street cleaning and sprinkling; snow removal; bridge and culvert construction and maintenance; licenses for cars, wires, track, poles and advertising; free transportation of police and firemen; and in some states a special tax for the support of the public service commission.

The speaker stressed the importance of the paving burden, stating that the industry actually is investing 3.5 to 4 per cent of its gross revenue in interest charges and replacement of paving alone.

The conclusion of Mr. Irelan was that now is the time for the industry to present its argument and facts to the public toward the elimination of these indirect and unusual taxes. In this movement, he said, the Midwest Electric Railway Association should aid by presenting the facts uniformly to the proper state officials.

In the ensuing discussion Mr. Lockwood said that the United Railways of St. Louis had paid out 12 per cent of its gross revenue last year in taxes of one kind and another, including maintenance of paving. In describing conditions in St. Louis, he said that the company is required to make the investment and pay the interest charges for paving the 17-ft. strip in the track zone, and then is required not only to maintain this paving, but its cost is added to the capital account of the company, and is again assessed in the form of general taxation.

A form of indirect taxes of unusual interest was described by Mr. Buffe. He said that the practice in Kansas City is to charge the company one-third of the cost of construction of bridges and viaducts. Mr. Welty cited a unique argument which had been used in Omaha to answer the railway company's requests for relief from paving burdens. In this case, he said, one of the reasons advanced for having the railway continue to pave its right-of-way was that its paving was so much better than that put down by contractors for the city, that it was of advantage to the city to have the company continue paving its strip.

Future of the Interurban

A paper on the past, present and future of the interurban railway was presented by Charles W. Ford, general superintendent Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo. He traced the history of the interurban through its early stages, showing how many roads were projected and built without sufficient justification from a financial standpoint.

Since 1914, he said, there have been practically no new developments, and few extensions to existing lines. This, however, is an indication that the wildcat promotion days are past.

Additional sources of revenue have been developed by the interurbans, such as express freight and carload freight. Increased fares and increased passenger traffic also have assisted in allowing the companies in the Middle West and Southwest to show reasonably good operating reports.

As to the future, Mr. Ford feels that the bus and the truck are not going to replace the interurban railway, as it is the cheapest and most dependable mode of travel between cities in well-developed territory. Regulation of competition will come in due course, and with the advent of lighter cars the riding can be increased and headways shortened. Freight, particularly in carload lots, should be solicited, and industries should be encouraged to locate along the lines.

Mr. Ford's paper was discussed by a number of those present. Increasing competition from private automobiles and buses was held to be forcing the electric railroads in many locations to depend more and more on freight hauling as a source of revenue.

Revision of the Constitution

A committee consisting of R. J. Lockwood, chairman; R. B. Campbell, Bruce Cameron and Otis Turner of St. Louis reported on certain revisions of the constitution of the association. The most important of these was the provision for three regular meetings per year, and the inclusion of the grade of honorary membership. The recommendations of the committee were adopted.

Reports of the retiring president and of the secretary-treasurer showed the association to be in a healthy financial condition at the end of its first year of activities. President D. L. Fennell,

superintendent of transportation Kansas City Railways, said that one of the objects in the organization of the association had been to give department heads and subordinate officials of the various companies an opportunity of getting better acquainted with the general problems of the industry and of taking part in the proceedings and discussions.

Officers and members of the executive committee for the ensuing year were elected as follows: President, Charles W. Ford, general superintendent Kansas City, Clay County & St. Joseph Railway; vice-president, E. Stenger, receiver the Denver Tramway; secretary-treasurer, J. A. Weimer.

Members of the executive committee: Two-year term, S. B. Irelan, R. A. Leussler, R. B. Campbell and D. L. Fennell; one-year term, H. B. Cobban, F. G. Buffe, R. J. Lockwood and A. E. Reynolds.

The executive committee held a meeting immediately after adjournment of the general session and elected R. J. Lockwood as chairman.

On Wednesday evening the association was entertained by the Omaha & Council Bluffs Street Railway at a dinner given in the Omaha Athletic Club. This was followed by a theater party in which the members of the association were the guests of the local railway.

Service and the Man Who Sells It*

By F. G. Buffe
General Manager for the Receivers Kansas City Railways

THE Rotary Club motto, "He profits most who serves best," is particularly applicable to the street railway industry. Although we are in the selling business, we cannot be compared with the salesman who was happy because he made one sale every five years, his business being the selling of suspension bridges. We sell our product to every man, woman and child in the community an average of 275 times a year. We have 26 opportunities a month of making a friend of every citizen, and it is too often the case he will remember the one time when service was poor and forget the 25 times when it was good. We are in a different position from any other utility that sells service because we come in daily contact with our customers, under trying conditions. The light, gas and water companies render a monthly bill, whereas we collect at the time service is rendered.

There are other factors that make it difficult to please our patrons. We are living in a rapid age, dealing with a public educated to speed and rubber tires. This induces a psychology which affects us adversely. Our customer has been educated to believe that street car service is not rapid. The noise, the stops and starts tend to irritate him. There was a time when the street car was the fast means of urban transportation. The average man does not take into account that, all things considered, due to traffic congestion and parking difficulties, street car speed on the average is as good as the automobile, because he does not get the same sense of motion that he does in the automobile.

The street car business today is competitive, not so much with other public conveyances, but it has to meet competition of the private vehicle and overcome an adverse mental condition. The claim that our transportation service is the best—on the average the fastest, cheapest, the most convenient and the safest—is no longer accepted as a fact but requires proof and salesmanship.

The industry magazines of the last few years are full of articles on merchandising transportation selling service, training employees, proper publicity, and other methods of overcoming this mental hazard, and the time of our meetings and conventions is largely occupied with similar subjects. We have been forced to add an up-to-date sales department to an organization which in the past has been entirely concerned with operation and the manufacture of service. Some companies have gone so far as to add commercial managers. The weekly pass, which is an effort to wholesale transportation, is being tried.

Street railway service naturally falls into two divisions, one which the public sees and with which it comes in contact, and that part behind the scenes of which the public has but a hazy idea.

The public judges service by the cars; the riding qualities of the track, the headways and load conditions, and the appearance and actions of the trainmen. These are the show windows. Our patrons do not come in contact with the average two men per car behind the scenes. They do not realize the investment in shops, power plants and distribution systems, nor do they have any concrete idea of the tremendous organization and the constant effort in the background which is just as vital.

Such a situation has a tendency to reflect itself in the organization itself. It is comparatively easy to convince a platform man that part of his job is selling service, but sometimes difficult to convert the shop man to the idea that he is similarly engaged. The public to him is remote, and there is no direct contact, no immediate connection.

We of the street railways, regardless of our jobs, whether in the office, on the platform or in the pits, must work for just one end—transportation. Every other activity of necessity must be subordinated to this one objective. A track department may have ideas on track, the proper time for construction, temporary service, etc., but its ideas must in the end conform to good transportation service. In Kansas City we allow ourselves only 5 per cent of our total equipment out of service at any time for all shop and mechanical purposes. It would be easier to work out a shop schedule based upon 10 per cent, but to do so would not permit us to give our standard of service, so the shops have to do the necessary thing and adjust their program to transportation needs.

The first essential in training this sales force behind the scenes is to educate and instruct supervisory officials. It is surprising how much effort is needed along this line. Too frequently is it the case that foremen, dispatchers, inspectors and those officials who come in most direct contact with the men under them, and upon whose shoulders falls the immediate responsibility of carrying out orders and policies, do not get the inspiration that comes from contact with others in the same work in other cities by attending meetings and visiting for purposes of comparison. Very often, due to an insufficient number of supervisory officials, their work is of a nature that leaves but little time for reading or development. All this is wrong, and happily is one of the conditions that gradually is being corrected in the industry. Salaries should be commensurate with those for equal responsibility and effort in other lines. There should be every effort to bring technically trained young men into the industry.

The training of the supervisory force should not stop with department heads, but should be carried down until every man who exercises authority in any degree has been thoroughly imbued with the spirit of salesmanship and the ideal of service.

How often does one hear a stranger say: "You have the finest set of men I ever saw," or the reverse? A surly, slovenly transportation force is the quickest route to public condemnation. Transportation salesmanship requires among many others some of the following qualities: Neat appearance; a pleasant smile and manner; tact in enforcing fare and transfer regulations; helpfulness to passengers, especially old women and children; good judgment; a thorough knowledge of the city, routes, transfer points, etc.; a pride in his job and in his company; the conviction that he is a salesman selling a necessary service but at the same time a competitive one.

Employees in other departments should understand that they are the company's representatives both on and off duty; that poor work in any branch in the end means poor service. They should get the spirit of public service and realize in every operation they perform that they are quasi-public servants.

Company Publications Help

Company publications are very effective if properly edited and prepared. Such a publication cannot be all lectures and good advice. It must be snappy, entertaining, provide good reading for the employee and his family, promote a co-operative spirit, and develop an organization morale. It must be a newsy magazine devoted to the organization and its doings, and must be written from the standpoint of the employee rather than that of the company.

Practically every company today has some form of committee system, either

*Abstract of a paper before Midwest Electric Railway Association, Omaha, Neb., June 11-12, 1924.

union or non-union, and it is a mistake to allow this elaborate machinery to function solely for the adjustment of grievances and the settlement of wage disputes. Every proper matter of policy that affects operation or the employee, directly or indirectly, should be brought before and worked out by these committees. The men should understand that they are vitally interested in all the operations of their company; that their advice is valued and their co-operation required.

Give Praise for Meritorious Work

Don't be afraid to praise your organization. When some big thing has been accomplished, encourage and foster the spirit that your particular organization is the best in the country. If the organization has done a meritorious thing—has handled unusual crowds—has operated with a low accident record—say so. Let the men understand that you realize these things are not done solely for a money return but because they are proud of their organization and the service they are rendering.

One of the most effective methods of getting the sales and service idea over is by personal talks to the men by company officials. They bring in the personal touch and are more effective than the printed page. We are all humans, all on the same payroll, and all working for the same purpose. Give me the friendly organization every time for results.

Bringing the Latest and Best to Railway Men*

The Use of Modern Methods in All Departments of the Electric Railway Is Advocated—Don't Be Afraid to Copy Good Practices Even Though They Are Not Original

By R. F. Carbutt
Railway Engineer H. L. Doherty & Company, New York

IN CONNECTION with the work of the American Electric Railway Association committee on city operation, I have been impressed with a situation which exists in our industry. This I shall attempt to analyze on the basis of the observations made in visiting various railway properties in New York State and New England. The situation to which I refer is that generally, as an industry, we do not make use of modern methods of electric railway operation that are in effect here and there throughout the industry.

Information regarding modern methods is collected and disseminated by Electric Railway Journal, *Electric Traction, Aera,* by committee reports and papers. We discuss them in our conventions and meetings such as you are holding here in Omaha today, but we don't put them into general effect. The modern methods to which I refer are not the ones that require a large expenditure of capital. Up to date, from New England and New York State alone, I have received seventy comprehensive one-page descriptions of modern methods, only a very small number of which require the purchase of new equipment. They are modern methods of securing public good will, of developing good relations between management and employees, of training personnel, of popularizing electric railway service, of securing economies in operating and maintenance practice and of securing relief from paving burdens and other imposts.

Use Methods Tried by Others

You say "Why copy the ideas of others, why not be original?" Originality is, of course, highly meritorious. We should be looking for the new ways of doing things. But lots of us can benefit merely by applying to our own property modern methods proved feasible and profitable by others in our industry.

We should not be backward, either, in putting it up to the manufacturer of the materials and equipment we use to give us better and more efficient and less costly materials and equipment for use in electric railway transportation. But we have not begun to scratch the possibilities before us until modern methods in use here and there are widely used in the industry.

Apply Modern Methods to Present Systems

I do not mean to infer by anything I have said that adopting modern methods means discarding our present general scheme of providing transportation by the electric street railway and electric interurban railway. I am not opposed to the use of the gasoline passenger bus or the interurban bus by the electric railways, and do not hesitate to recommend its use where it is economically justified, but I believe in co-ordinating the gasoline bus with electric railway operation, and not in the substitution of the bus for the latter.

I could give you many specific references to prove that what we need is the adoption of modern methods in the operation of our present systems, but for the sake of brevity and to emphasize the fact that the condition just referred to does exist, permit me to quote from the 1923 report of the Charles A. Coffin Prize Committee, composed of C. D. Emmons and James H. McGraw:

"From the representations of the winning company, the committee finds that on this property there have been carried to fruition most of the things that have been talked about for years as the remedies for various troubles. On this property the remedies have not only been talked about; they have been executed. Thus the winner stands out as a railway that has largely accomplished the task of gaining public good will, of merchandising transportation, modernizing service and equipment, improving the financial structure, and so on. There is no one great achievement on which the committee has based its award, but rather upon the accumulated results of a great many small accomplishments."

Mr. Budd did not claim originality of methods for the Chicago, North Shore & Milwaukee, but merely the use of modern methods we have talked about. In expressing his appreciation and thanks for the award of the Coffin Prize on behalf of the Chicago, North Shore & Milwaukee Railroad, Mr. Budd said in part:

"We have done little that is unusual, and little that is original. Practically all our methods are methods and engineering practices that are discussed in this great American Electric Railway Association and in its committee meetings. We have simply taken advantage of every opportunity that presented itself to modernize and make popular electric railway transportation."

Efficient, Humanized, Personal Service

Doubtless this same policy of adopting modern methods in use here and there accounts for the recent success of another company directed by Mr. Budd, the Public Service Company of Northern Illinois, in securing the Coffin Prize for distinguished accomplishment in the light and power field. Many inspiring things were said at the 1924 National Electric Light Association convention in Atlantic City and many methods advocated that showed great care in their preparation, but a few words uttered by Mr. Budd at the N. E. L. A. convention this year gave me a thrill and stand out clearly in my memory above the expressions of other speakers. In accepting the Coffin Prize from President Johnson Mr. Budd regretted time did not permit him to tell a little about the winning company, but he said the company he represented "was endeavoring to give an efficient, humanized, personal service." That statement is a very broad one and summarizes in a few words what might have been profitably elaborated into a very lengthy description of methods, policies, activities and efforts. I have tried to visualize, many times, since hearing that expression, what it would mean to the banking credit of the electric railway industry if we were all giving an efficient, humanized, personal service. The unregulated competing bus and even the private automobiles would not present the problem they do today, if we all gave that kind of a service.

My sympathies are entirely with the electric railway operator, and I appreciate fully that no class of men give of their strength and personal sacrifice for the service of the public to the extent that he does. I want to suggest a reason or two for the lack of a more general application of the many improved methods developed by individual properties.

Now just why does this condition exist? One reason is because most railway organizations have been cut down to a skeleton form during the

*Abstract of a paper before Midwest Electric Railway Association, Omaha, Neb., June 11-12, 1924.

economic pressure of the World War and post-war period. The result is that the average street railway and interurban company does not have free lances on its staff who have the time and the funds at their disposal to investigate the modern methods being used and apply them to their property. In many cases there is no one available even to review the trade journals and work up the application of modern methods were described.

Special Committees Can Help

And now what is the remedy that may at least be of some help and can be of great help if properly used? Through the suggestion of the man who has been winning these prizes a committee was appointed last November to make a survey of the entire street railway and interurban industry, throughout the entire United States, with the object of collecting a description of modern methods in use and disseminating this information throughout the industry.

In the case of some companies, of course, this will not suffice. It will be necessary and advisable for some of us to call in specialists to study our situation thoroughly, diagnose our ailments, and prescribe remedies after careful and due consideration of all the facts in the case. But many of us will be able vastly to improve our situation if we will use the information Mr. Budd's committee is collecting and apply the methods to our own property.

The handbook the committee is preparing will consist of one-page summarized, comprehensive descriptions of each modern method called to our attention so they will not be burdensome for you to read. You will be able to use this handbook to check against your own operation and see just how modern you are.

The result of all this will mean that the small company which does not have free lances on its staff with the time and funds at its disposal to investigate the modern methods used by others will have part, at least, of this service made available to them at a very moderate cost.

Some Have Lost Faith

Another reason the condition referred to exists in the industry, that is, modern methods not universally used, is, I believe, that some of us have lost faith in the soundness of our electric methods of handling transportation and we don't bestir ourselves to keep modern. Psychology has had a lot to do with the situation. Some of us have listened and believed some of these false prophets that have told us we were all wrong and sick and about to die.

These false prophets overlook the fact that the conditions are not the same in the application of the two general systems where the gasoline bus is recommended to supersede the electric street cars. If gasoline buses are to be operated by a number of irresponsible people, of no financial standing or credit, not required to give continuous service, over definite routes, at stated intervals and during all seasons; not required to protect passengers from damage and accidents; unregulated as to accounting system; permitted to charge a higher rate of fare; relieved of paving, snow removal, sprinkling and cleaning streets, burdensome taxes and other imposts; of course they can compete with the electric street car.

Instead of believing these false prophets let us believe men like Peter Witt and Henry L. Doherty.

In an interview in the June *Aera* Peter Witt is quoted as follows:

"I am not worried about the future of the street railways. Economic law rules the roost—the most efficient and most economical facility for any particular purpose survives. Vehicles mounted on steel wheels running on steel rails are moved at least expense and with greatest speed. That's why the street cars will continue to carry the crowds, and why the bus and private automobile are not going to put them out of business. Street railway operators must make their service more attractive, their cars more commodious and comfortable, and city governments must co-operate with them."

In the annual financial review, supplement of the New York *Tribune* for Jan. 7, 1924, Henry L. Doherty, commenting on the railway's return to prosperity, was quoted as follows:

"The street railway business received a severe jolt by the high level of prices for labor and material caused by the war, but these companies are gradually getting back on their feet. The business is still intrinsically sound, and can supply service to the public at a price the public can afford to pay, and well below the price which would have to be charged by any other form of transportation where the same service is rendered."

To summarize the one thought I have attempted to convey, let us universally, as an industry, have faith in our electric street railway and electric interurban scheme of handling transportation; apply modern methods to their operation; co-ordinate this service with bus operation where economically justified; and in every community, attempt to give efficient, humanized, personal service.

Welding Shops and Electric Rolling Stock Discussed by A. R. A.

At the Atlantic City Convention of the American Railway Association Mechanical Division, Just Closed, Reports Which Have Points of Particular Interest to Electric Railways Were Made by Several Committees—Electric Locomotives Discussed

SESSIONS and exhibits for the mechanical division of the American Railway Association were held at Atlantic City, June 11 to 18. Some of the committee reports presented have sections of interest to electric railways and these are abstracted herewith.

Autogenous and Electric Welding

The report of the committee on autogenous and electric welding contained several plates showing the effects of welding on the metal in the tread and flanges of wheels and the structural transformation of axles. In the case of electric welding of steel and steel-tired wheels the difference in physical properties found at different depths from the point of application of the metal is evidently due to the order in which the various layers of filler metal were applied. The hardest zone is produced under application of the filler metal while the base material was relatively cold, acting thereby as a more severe quenching medium against the zone heated by the arc of welding than in cases where the tire had been to some extent preheated by previous heat of welding. In this case the maximum increase in hardness and strength of the base material, due to the transformation of the structure by welding, was approximately 40 per cent and the hardness of the applied low carbon metal was approximately 55 per cent of the original hardness of the tire material.

The structural transformation of tires by gas welding showed a reverse condition, inasmuch as the heat imparted to the base material has a slower penetration than the electric arc, and instead of increasing the hardness and strength in the transformed zones, the physical properties were lowered as a result of annealing by the slow application of the heat. The maximum decrease in physical properties of the base material by gas welding amounted to approximately 24 per cent. The hardness of the filler metal itself is approximately the same for the gas and the electric weld, but the gas weld shows distinct decarburized zones forming the junction between the applied filler metal of the base material. Similar conditions were found for rolled steel wheels.

Welding of steel and steel-tired wheels will invariably cause a distinct local change in structure with resultant internal stresses unless the material is properly preheated and annealed after welding. It has to be considered further that the applied filler metal, either carbon or alloy steel, has, in most cases, different hardness and physical characteristics than the base material; moreover, with the gas welding process a pronounced decarburized area is formed between the base material and the filler metal. For this type of welding it is very probable that the filled-in areas will slough out readily by parting along the decarburized zone. Against this the electric weld has the pronounced disadvantage that unless a rather deep penetration of the heat is obtained, with consequent increase of internal stresses, the filler metal will not adhere properly. The committee holds that there is no doubt that if welding of this kind would be permitted rulings as to proper preheating and annealing would in a large number of cases be disregarded, and wheels and tires in a state of high internal stresses

would be placed in service, with the result that failures directly due to the welding would occur.

Welding of Axles

A similar condition of structural transformation due to welding exists on axles where the carbon ranges above 0.30 per cent. The transformation in structure with corresponding internal stresses at points in an axle where bending stresses of any magnitude occur will readily permit development of detail fractures, and welds can, therefore, not be permitted on any part of the axle, with the exception of the building up of end collars, where practically no bending stresses exist. Such welding may be done by the electric welding method without preheating or annealing. The gas method is not recommended unless it is controlled so as to avoid the possibility of excessive heating during welding, which may, if not properly controlled, cause transformation of the structure at the point where bending stresses occur.

The report of the committee illustrated the service failure of a railroad motor car axle on which the inner fillet of the journal bearing had been rebuilt by the electric process. The fractured face showed a distinct progressive failure starting from the zone of applied filler metal. The longitudinal etching showed the pronounced structure transformed which caused internal stresses, evidently the direct cause of development of rupture. The pronounced structural transformation indicated that the axle was not preheated or annealed after welding.

On low carbon steel the transformation of structure due to welding heat is not very severe, and while it is desirable to remove all local transformation of structure by annealing, in a number of cases the service stresses of the welded member are such that welding may be done without subsequent annealing. The general rule, however, applies that on account of the more gradual heat applied by the gas welding method the transformation in structure is less abrupt and the internal stresses imparted to the material are, therefore, not as severe as those obtained by the electric welding method. Moreover, the fusion obtained by the gas welding method is better and the filler metal shows less slag and oxide inclusion than that applied by the electric welding process.

While it is possible to weld, with relative small reinforcement, wrought iron by either the gas or electric method, so that the yield and ultimate strength closely approximates the strength of the bar itself, the filler metal shows practically no ductility. Fatigue tests on specimens of uniform cross-section, welded and non-welded, wrought iron bars, tested under identical conditions of deflection, showed the resistance of the welded section against vibratory stress to be approximately 50 per cent of the non-welded bars, gas welds being slightly superior to electric welds. Good quality area caused the vibratory fractures in practically all cases to occur through the base material adjacent to the reinforced section, at about the same number of deflections as were obtained for the non-reinforced welds. This is evidently due to localization of bending stresses caused by increased stiffness of the reinforced section. Therefore on wrought iron where the resistance to vibratory stresses is of prime importance, such as in arch bars, welding of cracks cannot be permitted, according to the report. Worn places may be built by either the gas or the electric welding method, provided the original cross-section of the bar has not been reduced below a specified minimum. Where the built-up parts are subjected to vibratory stresses it is preferable to anneal subsequent to welding.

All cast-iron parts, except cast-iron wheels, may be welded. The gas welding method should be used wherever possible. Welds of 100 per cent strength, without reinforcement, can be obtained readily by proper preheating, using cast-iron welding sticks.

Welding of flat spots on cast-iron wheels produces a similar condition as is found on welded wrought-steel wheels and tires. The welding heat causes a distinct change in structure of the material adjacent to the weld. Moreover, on account of the relatively high internal stresses which exist in all chilled cast-iron wheels, such welding could only be done by careful preheating of the wheel followed by uniform cooling, inasmuch as heat locally applied would readily cause cracks through the chilled area like those produced by excessive brake-shoe action, or even entire rupture of the wheel. The filler material itself would be much softer than the chilled portion of the wheel, and a filled-in area would offer little resistance to wear. It is doubtful that cast-iron wheels would be properly preheated and cooled when welded, hence wheels in a state of highly unbalanced stresses might be placed in service. The committee therefore recommends that any welding on cast-iron wheels be prohibted.

In general, it may be stated that welding or heat cutting will impart internal stresses to the base material which are in approximate direct ratio to the carbon content and in inverse ratio to the original temperature of the base material. These stresses are produced by the local transformation of structure, which is caused by heating the surface metal to a temperature above the recalescence point and the underlying cold base metal acting as a quenching medium. With normal conditions any detrimental effect on the base material can be removed by subsequent annealing or sufficiently high preheating. Welding or heat cutting of medium or medium-high carbon steel should, therefore, be done only under careful supervision, and in no case should any such welded or cut material go into service without full assurance that after these operations were performed the entire part was annealed at a temperature above the recalescence point of the steel or that the affected zone, which increases in depth with the increase in thickness of material, was removed by machining.

The committee recommended that the welding of cracks or fractures be not permitted on such parts as air reservoirs, brake levers, drawbars, steps or step straps, and wheels.

Specifications for welding wire submitted as recommended practice were drawn up to cover the usual grades for electric and gas autogenous welding. These were prepared in co-operation with the American Welding Society. No attempt was made to cover welding wires for certain special purposes, as it was felt that these special grades of wire might not be applicable to the general purposes and would cause confusion among users, if included in a general specification.

Wheels and Wheel Mounting

The report of the committee on wheels contained information in regard to the application of new specifications adopted last year for cast-iron and rolled steel wheels. Considerable information was also given in regard to developments in cast-iron wheel design and cast-steel wheels. Since at present the manufacture of cast-steel wheels involves a patented process, the committee did not feel that a standard specification should be issued now.

The type of wheel mounting gage used by the railway association has been subject to considerable criticism during the past year. This mounting gage was primarily designed for use on cast-iron wheels, and when used on steel wheels special conditions are found to exist which make it unsatisfactory.

Where two sharp-flanged wheels are mounted together use of the standard gage results in improper mounting. That is, when the wheels are turned they will be found to be spaced too wide. This practice of mounting two sharp-flanged steel wheels is common practice on many roads, as they dismount sharp-flange wheels to re-mate, in order to save metal on mated wheels.

The opinion of the committee as to the proper way to mount rolled steel wheels is to use a spreader gage, such as is used in mounting locomotive tires. This gage should be 53⅝ in. long. The committee does not recommend that this be made a standard gage of the association, but suggests that the individual railroads equip themselves with gages of this type for checking the mounting of rolled steel wheels.

The standard steel wheel gage adopted in 1923 is gradually coming into general use. Generally speaking, this is giving satisfactory service.

Electric Rolling Stock

The report of the committee on electric rolling stock contained a summary of answers to questions covering the period for inspection and repairs which showed eight roads favoring mileage, one favoring hours or days in service and one favoring input. Two others recognized power input as a factor but considered mileage more practical. The wide variation of mileage specified between periods of inspection and repairs indicates the difficulty in establishing definite figures. Five roads reported in favor of daily inspection and five against it. At present all roads practice the customary daily inspection and a more or less perfunctory electrical inspection to determine whether or not the equipment responds to various control operations.

The report of the committee on design

of shops and engine terminals included answers to questions regarding the serving of machine tools by traveling cranes, which indicated that the consensus of opinion is that a traveling crane should serve all the largest machine tools. A study of replies to a question in regard to location of locker and washroom indicated that the majority of shops which do their work on the first floor also have their lockers and washrooms on the first floor or in an outside building. Practically all the shops that do their work on the balcony have lockers and washrooms on both floors.

Electric Locomotive Discussed

Following the paper on electric locomotives by F. H. Shepard, Westinghouse Electric & Manufacturing Company, which was abstracted in last week's issue of the JOURNAL, J. A. Carmody, New York Central, presented some facts in regard to the performance of their locomotives. He said that now, after 17 years of passenger service, the original 35 Type S locomotives are about to be shopped for general overhauling. During these 17 years the 35 locomotives have made an average of 450,000 miles each or approximately 2,200 miles per locomotive per month. The average cost for maintenance, including inspection, repairs, renewals and painting, has been about 6 cents per locomotive-mile. It is estimated that the cost of general overhauling will be about $12,000 per locomotive. The additional 12 locomotives purchased in 1908 have been giving equally gratifying results.

A comparison of advantages of electric versus steam locomotives was given by W. L. Bean, New York, New Haven & Hartford Railroad. He said that the first group of 40 electric locomotives purchased by his company are about 17 years old and have run approximately a million and a half miles. They are still used in heavy express service.

Southern Equipment Men to Meet at Erie

THE regular July meeting of the Electric Railway Association of Equipment Men, Southern Properties, will be held at Erie, Pa., on July 23 and 24. The first day of the session will be spent in discussing various problems that are common to these railways, and exchanging ideas. The second day of the meeting will be spent in inspecting the local shops and carhouses.

Wyoming Association to Meet

A TWO-DAY convention of the Wyoming Utility Association will be held at the Elks Club, Casper, Wyo., June 23 and 24. Among the papers the following should be of interest to electric railway men:

"The Motor Bus as a Public Utility," by William B. Cobb, Casper; "Uneducating the Public," by George E. Lewis, Denver, Col.; "Winning Public Confidence," by C. L. Titus, Cheyenne.

Recruiting Transportation Employees*

One of the After Effects of the War Has Been a Noticeably Reduced Efficiency of Transportation Employees—Present Methods of Their Engagement and Discipline Are Described

By D. PRINS
Transportation Engineer Brussels Tramways, Brussels, Belgium

THE thirty-one companies which replied to the data sheet sent out by the association report lower efficiency and less regard to discipline among transportation employees than before the war. This is shown in the larger number of accidents, higher consumption of energy in car operation, waste in material and carlessness in fare collection. The subject will be considered under four heads, namely (1) motormen, including chief motormen, (2) fare inspectors, (3) conductors, (4) a special report on the supervision given to motormen by the Brussels Tramways Company, especially in connection with the subject of energy consumption.

Motormen, Including Chief Motormen

Practically all of the companies replying report the employment of chief motormen, as well as motormen. The number of chief motormen on the different systems varies greatly, but the following are typical: Amsterdam has 25 chief motormen to 304 cars and 10 buses, or an average of one to every 12½ vehicles. Antwerp has an average of one chief motorman to every 43.2 cars, Brussels one to every 33 cars and Copenhagen one to every 36.5 cars. The duties of a chief motorman are not only to instruct new motormen and check up the performance of the older men, but also to help out the inspectors in case of accident where their technical knowledge of car operation will be of help, to watch out for operating economies in the car service, etc.

Generally, these chief motormen are promoted motormen, though two companies report they are recruited exclusively from among the inspectors and three others use their inspectors to perform the duties of chief motormen. A number of companies require a minimum service of 10 years before appointment as chief motorman, and the age limit is usually between 35 and 40 years. After instruction, a candidate for such a position has to pass an examination before being appointed. On most roads the chief motormen are instructed to pay special attention to means for securing economy in energy consumption. In Brussels, economy is secured entirely through this force, as meters are not used, but this point will be taken up in greater detail later.

If these men are chosen carefully, their services are fully warranted. Their examination should be partly oral and partly written. They should be asked, for example, what steps in the way of rerouting to take in case of a breakdown at an important crossing or elsewhere on the line, etc. They ought to be subject to re-examination periodically, and it is advisable at least once a month to have such a man return to the front platform as a motorman for one or more trips to keep familiar with a motorman's duties. Periodical physical re-examinations are also desirable. On systems operating from 200 to 400 motor cars a chief motorman for every 30 cars is a reasonable allowance.

The regular motormen, on the properties replying to the data sheet, are recruited from various fields, varying with the location of company. Thus, the Bordeaux company reports its force recruited 50 per cent from agriculturists, 20 per cent from city laobrers, drivers, etc., and 30 per cent from the semi-skilled trades. The company in Nice gives the percentages mentioned as 27 per cent, 31 per cent and 42 per cent, whereas Bucharest reports that 97 per cent of its force of motormen came from the farms. In Paris the company declines to employ skilled or semi-skilled men, because it finds that these men accept a job on the platform only as a stop-gap and will return to their better paid trade as soon as opportunity offers.

A number of companies (10 out of 31) select their motormen from among the conductors. Thus, in Copenhagen every platform man is first taught the work of a conductor. Then after two years he learns how to be a motorman. Then he serves alternately at the two jobs until his seniority is such that he may be permanently assigned to one service or the other. Thus, this company has 594 men working only as motormen and 468 who work sometimes on one end and sometimes on the other end of the car.

Generally the companies report the minimum age for employment as 21 to 25 and the average maximum age at 35.

The period of instruction for motormen, according to the reports received, is about six weeks. In Paris, from 17 to 21 days of this time is spent in the school and six days on the road. Several companies like Bordeaux and Naples have a special school car, which operates over the system. In Brussels use is made of a text book, giving all the information which the company believes the motormen require.

A number of companies do not pay student motormen for the period spent in instruction. Others pay a certain sum, but only at the end of the period and if the man is employed. On certain properties a government examination is required before a man qualifies. About half of the systems reporting have re-examination of the men at periods of from two to six months, a year, three or five years.

Where economy meters are used, it is customary to give some sort of a bonus to the men for savings effected. The Bordeaux system has worked out an ingenious formula for the purpose.

*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

This formula is

$$P = \left(B - K\frac{B-b}{n-1}\right)N$$

in which P is the amount of monthly bonus to be paid, B is a selected maximum for the daily bonus, b is a selected minimum for the daily bonus, n is the number of motormen winning bonuses, N is the number of days' work during the month by the man, and K is a factor whose value is 0, 1, 2, up to $(n-1)$, according to the rank in the saving of energy. In practice on this road, $B = 0.7$ franc or 3.5 cents and $b = 0.15$ franc or 0.75 cents. Then the best motorman, if he worked 28 days, would receive in cents at the end of the month $P = 3.5 - 0\left(\frac{3.5-0.75}{n-1}\right)28 = 98$ cents, and the lowest motorman would receive $P = \left(3.5 - (n-1)\frac{3.5-0.75}{n-1}\right)28 = 21$ cents.

Havre gives its bonuses at the end of the year, but only to employees who have no demerits for other faults. Marseilles gives an award of 16 francs (80 cents) per month to every motorman who has had no collision or accident for which he was responsible.

The European system of zone fares requires a corps of fare inspectors who board the cars at intervals and inspect the tickets to see that passengers are not over-riding the distance for which they have paid. Since the war the conditions under which fare inspectors operate have become more arduous, partly because the electric railway systems have not expanded with the traffic so that the cars are crowded, and partly because of the laxity already mentioned in the standards of the conductors in collecting fares.

On most roads there are one or more chief inspectors to supervise the services of the inspection force. The total number of inspectors, as compared with the number of cars in service, is given for 14 principal cities in the accompanying table. To some extent, as regards street inspection, the duties of the chief inspectors correspond to those of the chief motormen as described, so that companies having a considerable force of chief motormen have a small force of chief inspectors and vice versa. As a rule, these men are recruited from existing personnel, either motormen or conductors.

Bonuses can be given for meritorious service, but it is somewhat dangerous to base them on the car-mile run during the day, as in Naples. The reason for this is that the inspectors have authority to short-route cars and should do so when the traffic requires it, but if their bonus is based on the car-miles run, they might instruct the motormen to increase the speed of their cars in the suburbs in order to avoid turnbacks. This would increase the car-miles run, but it would be at the expense of the service.

As with motormen, statistics as to the previous calling of conductors are on the various properties. In Paris skilled workmen are not desired for the same reason as with motormen. Christiania gives preference to those men who have passed an examination for non-commissioned officer.

The period of training also varies greatly. The maximum is probably Alexandria, where with the natives employed from 30 to 40 days is common, down to Naples and Lausanne, where the minimum is three days. In Paris five days are given in the school and from four to eight days on the road. In Brussels the time is nine days, divided as follows: One day theoretical instruction in the school, three days practical instruction on the line, the fifth day at the school with a couple of hours in the motorman's school to teach the manipulation of the brakes, the lighting circuit and the conduit plow, three days on the line, and the last day examination. Of the 31 companies reporting, only four felt the need of a school for conductors. Paris, which has three schools, uses a movie film showing all of the operations required in the daily work of a conductor.

In general, student conductors are paid while learning, though among the 24 companies reporting payment, seven withhold the amount until after the man is accepted. In Paris, as with motormen, the student conductor receives 14 francs (70 cents) if he does not quit learning voluntarily, and after he has been in the service six months gets 2.50 francs (12½ cents) more per day for each day served as apprentice. Only six companies pay anything additional to teacher conductors for instructing and on those properties the payment is only from 15 centimes to a franc (¾ cent to 5 cents) per day.

Eight companies still report the employment of some women conductors. Generally the pay is about 10 per cent less than that paid to men conductors.

Only a very few companies pay any bonus to conductors. Those which do are: (1) Naples, where the bonus is based on the gross receipts and car-miles; (2) Christiania, which has a merit system for bonuses; (3) Havre, which gives conductors the same bonus as the motormen but reduced in case of demerit; (4) Orleans, where the bonus is based on the receipts, and (5) Paris, which has a profit-sharing system for all employees.

INSPECTORS, CARS AND BUSES ON VARIOUS FOREIGN PROPERTIES

	Number of Ticket Inspectors	Number of Motor Cars	Number of Trail Cars	Total Cars and Buses per Inspector
Alexandria	65	72	57	2.0
Amsterdam*	21	304	224	25.6
Antwerp	37	216	137	9.5
Barcelona*	64	371	117	7.7
Brussels	78	463	371	10.6
Buenos Aires	230	1,570	750	10.0
Copenhagen*	54	426	440	16.2
Glasgow	82	974	...	11.8
Havre	42	102	41	3.4
Leeds*	42	370	...	8.9
Marseilles	161	425	451	5.4
Paris*	1,963	1,821	868	1.9
Rotterdam	24	201	156	14.8
Strasbourg	26	125	190	12.1

* These properties also operate buses as follows: Amsterdam, 10; Barcelona, 5; Copenhagen, 13; Leeds, 7; Paris, 1,115.

To become a motorman on the Brussels Tramways system, a candidate must be a Belgian, at least 22 years old and not more than 35 years old, except that a man having an honorable discharge from the army is accepted up to 40 years. The candidate also must have passed a satisfactory eye test. Then if his references are satisfactory he is allowed to take the examination for motorman.

His period of instruction lasts 15 days, during which he receives a daily wage of 5 francs (25 cents). During the first three days he reports at the school at 7:30 a.m. to receive theoretical instruction and in the afternoon operates a car under the direction of an instructor. The instructors are qualified motormen with at least ten years of experience and are paid 25 centimes (1¼ cents) per trip taken with a student. After the student motorman has run his car over a lightly traveled route he makes trips over other lines on the system, in each case being accompanied by an instructor connected with the depot from which the line runs. About the middle of his instruction period the man returns to the motorman's school, where the chief instructor examines him to see whether he remembers the instructions given. The three last days of the apprenticeship are devoted to an examination in the school and on the line, to determine whether he can qualify. It is estimated that the instruction of a motorman, including the payments to the instructors, costs the company about 93 francs ($4.65). A motorman is not fully accepted until he completes six months of service.

The motorman's school contains a full-sized car front platform with controller, hand brake, air brake, sanders, etc., also short full-sized sections of overhead trolley and underground conduit construction. Recently a few psychological tests have been added to determine whether the prospective motorman can think quickly enough to be depended upon in cases of sudden emergency to avoid accidents.

Instruction in car operation does not end after a man has been accepted. He is questioned from time to time on the principal rules, and if he seems unfamiliar with his work, he is required to take another course at the school. To help him, the company gives to each motorman a book entitled "What a Good Motorman Ought to Know."

Special instruction is given in regard to means of securing economy in energy consumption. Up to the present the company has not equipped its cars with meters, because it believes its local conditions would prevent their satisfactory use. Some of the lines are level, but many of the others are on steep grades, so that it would be impossible to establish any bogie per car-mile for energy consumption. Moreover, it is not the practice to operate either the same cars or the same motormen each day over the same lines, and experience has shown that even on the same lines the energy consumption per car-mile varies greatly according to traffic and other conditions.

In consequence, the company has put up the responsibility of economy in energy consumption to a special corps of men consisting of 16 "chief motormen," or inspectors, who travel over the system daily, watching the performance of the men and coaching them on what to do. There are about 470 motor cars on the system. The result, in the opinion of the management, has been satisfactory, as shown by the following figures on watts per car kilometer: 1916, 872.8; 1917, 867.4; 1918, 869.8; 1919, 861.3; 1920, 869.6; 1921, 846.7; 1922, 841.0.

The chief motorman receives a bonus monthly, depending on the saving made, as determined by the substation meters.

American Association News

Executive Committee

WHILE waiting for the arrival of President Budd, J. N. Shannahan, first vice-president, presided at the meeting of the executive committee held in New York on June 20, and disposed of the routine business. Other members present were Secretary J. W. Welsh, C. L. Henry, M. B. Lambert for H. D. Shute, J. G. Barry, J. H. Hanna, A. A. Hale, C. E. Morgan, J. K. Punderford, E. M. White, H. A. Johnson, W. H. Hyland, F. R. Coates, C. R. Ellicott, L. H. Palmer for C. D. Emmons, and L. S. Storrs.

Reports were heard from the secretary and from various standing committees, including finance, meetings and subjects, publicity, company membership, and individual membership. Mr. Coates, as chairman of the meetings and subjects committee, recommended that Wednesday be set aside as the day of the convention at Atlantic City in October on which no business meetings be held, the idea being to devote the entire day to the inspection of exhibits. His recommendation also provided that the meetings of the American Association should be held on Tuesday, Thursday and Friday mornings. The executive committee approved.

At this point President Budd arrived and took charge of the meeting. Mr. Henry reported for the committee on national relations. Speaking of the railroad labor bill, he said that the probability was that electric lines would be excluded when the bill comes up at the next Congress.

A motion was made on the floor of the Senate to reduce the car fare to 5 cents in Washington, D. C., but was lost on a point of order. An appeal was taken from the decision of the chair but the chair was sustained by a two-thirds vote. On Section 15a of the interstate commerce act, Mr. Henry said that the Interstate Commerce Commission had sent out a questionnaire and meant to make a decision for each individual road on the basis of the reply. In connection with the hearings on depreciation, Mr. Henry said that the commission will probably make a tentative order and then call for hearings on it. He was anxious that the electric railways should be prepared to present their case in the most effective manner and asked that the association authorize this work.

The exhibit committee reported to date that 71 manufacturers have made application for 41,694 sq.ft. of space, which compares with 18,000 sq.ft. on the same date last year. Of this space, 35 per cent has been applied for by bus manufacturers. There will be about 85,000 sq.ft. of space available this year. The executive committee approved the following resolution submitted by the exhibit committee:

Whereas, certain manufacturers of automotive equipment brought buses to Atlantic City during the 1923 convention and parked such vehicles at advantageous points in the vicinity of prominent hotels and extended invitations to various railway delegates to accompany their representatives on demonstration trips, and

Whereas, such practices tend to defeat the purposes of the exhibition by reason of such railway delegates absenting themselves at various times from the exhibition proper and thus perhaps neglecting the study of exhibits of other manufacturers; therefore, be it

Resolved, that this executive committee in meeting assembled this 20th day of June, 1924, hereby vote to look with displeasure upon any manufacturers having exhibits at any place other than that designated by the association.

Some discussion followed about the possibilities of emphasizing good management and modernization at the October convention. It was also suggested by Mr. Welsh that opportunity ought to be given railways to exhibit new devices or methods they had developed. Mr. Budd commented that if there were better facilities at Atlantic City he would send a new five-car train down there, and he thought other railway companies would be glad to show some of their new equipment. It was first thought that it would hardly be worth while to do this, in view of the fact that the only place such cars could be exhibited would be on one of the near-by streets. However, on further thought it was decided that with proper publicity at the convention directing attention to these cars, it would be worth while and plans will be set in motion to get car manufacturers and railway companies to provide a real exhibit of new electric railway equipment at Atlantic City.

As Mr. Collier expressed it, if there is anything which typifies electric railways it is mass transportation, and we need to have more in the exhibits which reflects the main work of the industry. The bus is new and attracts a good deal of interest, but it is not the vehicle of mass transportation, except as an auxiliary.

The exhibit of railway company devices and methods will probably be provided for by allotting space to the committees on city and interurban operation, whose function at the convention will be to bring forward the new methods and equipment they have found in visitations during the year.

President Budd suggested that in line with the work of pushing the idea of modernization, a committee of three should be sent to England, and perhaps France, to study the principal features of railway and bus operation there, and to see what there was of particular interest at the British Empire Exposition at Wembly. He suggested that if the association would send one man, he would send another and would ask Mr. McGraw to send one of the editors of ELECTRIC RAILWAY JOURNAL, as the third. Mr. Collier moved the appointment of this committee and approval of the plan. The executive committee passed the motion. Later on Mr. Budd took the matter up with Mr. McGraw and he promptly agreed.

Mr. Storrs reported for the committee on co-operation with the National Automobile Chamber of Commerce. He said that an effort was being made to determine whether the Chamber and the Railway Association could agree upon a common plan for relief of traffic congestion. Plans have been set in motion to bring together and collate all suggestions for relief made to date. These will be briefed and sent to the committee for consideration at its next meeting. It is planned that the committee may possibly father the idea of having a scientific survey made by an organization of experts, and perhaps of working out a complete plan for some one city to serve as a model. If this seems desirable, the matter will again come before the executive committee for approval.

Mr. Storrs brought before the committee a recommendation that the by-laws be so amended as to include within the membership of the association the bus subsidiaries of railway companies and to include the revenue from bus operation by railway companies as the basis upon which dues are to be figured. The sense of the meeting was to approve the plan in principle, but it was referred back to Mr. Storrs' committee to bring in a definite recommendation for rewording of the by-laws.

Mr. Budd then told the committee of the plan which has been worked out with universities in Illinois to establish public utility courses. This will be covered in a later issue of the JOURNAL. He also gave a last-minute report of the status of the campaign to sell $5,000,000 of prior preferred stock of the Chicago elevated lines on the "passenger partnership" plan, as the company calls it.

G. C. Hecker, of association headquarters, read a very interesting paper on revenue and expense from bus operation as shown by a number of electric railway companies, but the figures are not available for publication. Following this Mr. Budd commented that if the executive committee could do so, it ought to impress on railway men everywhere at every opportunity the importance of taking up the bus in its own and contiguous territory. He expressed again his regret that railway men were not prepared to take up the buses earlier. He thought the work of The Milwaukee Electric Railway & Light Company was an outstanding example of what can be done when a railway really takes hold of this new form of transportation. This company is acting as the medium through which the public is served with power, gas and all transportation service in its entire territory. This policy toward the bus has been satisfactory from the standpoint of public relations and has been an insurance that the railway would continue to dominate the service in its territory. Mr. Budd thought this program was worth whatever it had cost, though he believed most of the Milwaukee company's bus lines were self-supporting.

Mr. Budd said that the reaction of the people to the bus is very remarkable. They will champion the agency which gives them the service first, and if that is the railway then it goes to the railway's credit.

The next meeting will be held on July 18 at 2 p.m., at or near Cedar Point, Ohio.

The News of the Industry

Wage Offer Refused

Cleveland Railway President Promised Three-Cent Increase—Open Shop Basis Alternative

John J. Stanley, president of the Cleveland Railway, on June 17 made the motormen and conductors of his lines a new wage settlement offer. The proposal from Mr. Stanley followed the threat of the men to strike because the company had refused to grant them a wage increase of 12 cents an hour, as determined by a board of arbitration. The company characterized the finding of the board as "fraudulent." Mr. Stanley offered the men a rate of 57 cents an hour for the first year, 60 cents an hour for the second year, 61 cents an hour for the third year, 63 cents an hour for the fourth year, 65 cents an hour for the fifth and each succeeding year of service, with 10 cents an hour additional for all motormen and conductors acting as instructors of new men. The company's present wage scale calls for 55 cents an hour for the first three months of service, 58 cents an hour for the next nine months and 60 cents an hour after the first year.

The executive committee of the union voted unanimously to refuse the company's offer. Mr. Stanley was so informed at a meeting on June 18, and asked if he had any further concessions to make. He replied in the negative.

"This is my final offer," said Mr. Stanley. "It either must be accepted or I shall operate on an open shop basis, in accordance with the notice we had posted in the carhouses last Saturday."

William Polk, president of the union, said: "Things look dark."

It was the general opinion that the car men were likely to call a strike not later than Aug. 21.

Mr. Stanley said that if the men accepted this offer he would resume contractual relations with the union. If the men refused the offer it is said that the company will operate on an open shop basis.

Because of the men's refusal to meet Mr. Stanley before 10 o'clock on June 14, the company posted notices in all carhouses that dating from that time the company was being conducted on an open shop basis. Mr. Stanley said that the refusal of the union officials to discuss wages with him abrogated their contract.

It was expected that the posting of this notice would precipitate a strike, so the City Council brought Mr. Stanley and the officers of the union together. This meeting resulted in the men and Mr. Stanley agreeing to a truce of one week.

In a communication to the City Council on June 16 Mr. Stanley said he would be willing to have a new board of arbitration go over all the evidence submitted at the recent arbitration. He suggested that the new board consist of City Manager Hopkins, Mayor Townes and Federal Judge Westenhaver or an appointee of Judge Westenhaver. Mr. Stanley stated that he would abide by a decision of this board, but that to meet any award this board might grant, the City Council would have to raise the rate of fare, which is now limited to 6 cents by the Tayler grant.

Both Mr. Hopkins and Mayor Townes refused to act as arbitrators. The letter was not without good results, however, for it resulted in the resumption of the direct negotiations between the men and Mr. Stanley.

When the men received Mr. Stanley's offer, they asked for further time so that the union's executive board might decide whether to lay the matter before the entire union membership.

Tacoma Mayor Offers Fare Schedule

The latest development in the effort of the city officials to secure a 5-cent fare on the lines of the Tacoma Railway & Power Company, Tacoma, Wash., is the submission to the company of a proposal, framed by Mayor A. V. Fawcett, who heads the fight for lower fares. The Mayor has the united support of the Council to his proposal, which contains provision for an experimental period of revised fares. The proposal takes the form of an ordinance. The Mayor submitted it after he had refused to approve an ordinance proposed to the city by the Tacoma Railway & Power Company.

Mayor Fawcett's ordinance provides that the company will file and put into effect a six months' experimental tariff with the Department of Public Works at Olympia providing for fares as follows: Cash fare, 10 cents; weekly pass, $1, school tickets, forty for $1; tokens, twenty for $1, good for single ride. No transfers are to be given on tokens except on outbound cable cars, inbound cars on Twelfth Street line, North K Street line, South K Street line, and North and South Tacoma Avenue line.

It stated that the company might substitute buses for railway lines or supplement its railway service with buses.

The proposition submitted by the company, which Mayor Fawcett failed to approve, provided for twenty tokens for $1, continuation of the weekly dollar pass and a 10-cent cash fare. It also provided that if, under the administration of a proposed co-operative committee, the street railway fails to make a profit in two months the city tax its net instead of its gross revenue; if at the end of another three months the system is still losing, the fares be readjusted until a profit is shown.

Seeks Ten Cents

Poughkeepsie Company Would Raise Rates from Eight Cents and Discontinue Commutation Tickets

Application has been made to the Public Service Commission by the Poughkeepsie & Wappingers Falls Railway for permission to increase its cash fare within the city of Poughkeepsie, N. Y., and the village of Wappingers Falls and the fare zones between these places from 8 cents to 10 cents. The company also requests that it be permitted to discontinue altogether its monthly commutation tickets and to make certain additional charges for chartered cars. Fares now collected from school children are to be permitted to remain unchanged.

On June 4 the company filed with the U. S. District Court a complaint against the existing rates, and asked for an injunction which would restrain the Public Service Commission and the Attorney General from enforcing the rates then in effect.

A hearing on the motion for a temporary injunction was held before Judge John C. Knox in Federal Court in New York on June 10. Charles G. Blakeslee, counsel for the Public Service Commission, appeared in opposition to the motion, stating that the commission would be willing to act immediately on any new petition of the Poughkeepsie & Wappingers Falls Company. Judge Knox reserved decision. On June 11 attorneys for the railway and the commission appeared before Judge Knox and attorneys for the railway moved that the case be discontinued. This was agreed to by the commission and the Attorney-General. Judge Knox ordered the case discontinued.

A writ of certiorari was granted by the Supreme Court on July 9, 1921, after the commission had refused the company's petition for a 10-cent fare, but had issued an order granting an increase in fare from 7 to 8 cents. The commission filed a return to the writ on Sept. 23, 1921, after which the railway took no further steps until April 10, 1924, when notice of argument for the term of Supreme Court commencing May 6 was served on the commission.

The Supreme Court action was discontinued on May 21, and on June 4 the Federal Court action was started.

In its new petition the railway alleges that the existing rates are insufficient to yield a reasonable compensation for the services rendered, are unjustly and unreasonably low, do not provide sufficient income so that necessary reservations can be made for surplus and contingencies, and that in effect they are confiscatory.

In support of its application for a 10-cent fare the company places the probable original cost of its physical

property at $1,207,613.98, including $35,000 for working capital. It estimates the fair and reasonable present value of the property at $1,600,000 exclusive of working capital, and the reproduction cost new at $1,900,000. It said the 8-cent fare granted by the commission in 1921 has failed to provide a net return of 8 per cent on the rate base established at that time.

P.R.T. Bus Ordinance Up to Commission

The bus ordinance of the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, Philadelphia, Pa., passed recently by the City Council, was signed on June 16 by Mayor Kendrick. The measure grants to the Rural Transit Company a ten-year franchise for operating five lines of buses.

One line will operate the full length of Broad Street and another will ply between Broad and Sansom Streets and Sixty-third and Walnut Streets. A third will run between Germantown and Roxborough, and the fourth will cover a course from Bridge Street, Frankford, to Broad and Filbert Streets, by way of the Roosevelt Boulevard, Twenty-ninth Street and the Parkway. The fifth route will serve the far northeastern section, including Frankford and Somerton. The next step will be the submission of the franchise ordinance to the commission for approval.

Tentative Agreement Not Approved in Cincinnati

W. Kesley Schoepf, president of the Cincinnati Traction Company, Cincinnati, Ohio, has declined to approve certain provisions in the tentative agreement reached between the city of Cincinnati and the Cincinnati Street Railway, lessee of the system, for settlement of Cincinnati's traction situation. Mr. Schoepf explained that he was opposed to the provision calling for the appropriation of $30,000 annually for the maintenance of the office of the Director of Street Railroads and the method adopted for the repairing of streets in which rails are laid.

With reference to the Street Railroad Director's office, Mr. Schoepf said that he was opposed to the provision on general principles. He asserted that the money for the upkeep of the office would come out of the car riders' pockets. The office at present costs the city approximately $18,000 a year. Regarding the repair of streets between the rails, he said that the company operating the system should have full jurisdiction over the work. The agreement provides that the city perform the work at the cost of the operating company. The proposal provides for a 7½-cent car fare for three years and a capitalization of $28,000,000 for the operating company among other things.

The proposition is subject to the approval of the Mayor's traction committee and directors of the Cincinnati Street Railway. The matter will not be submitted to the directors of the Cincinnati Traction Company, in view of the fact that Mr. Schoepf is not in accord with all the provisions.

Economies in Toledo Approved

A program of economies estimated to save about $500,000 annually in the operation of the Community Traction Company system at Toledo has been agreed upon by members of the board of control. Among the proposals for putting the system back on a profitable basis without raising fares beyond present rates are the following:

Abandonment of the Indiana Avenue line at a saving of $54,000 annually. This has been before the Council on a previous occasion but was turned down. The Mayor will propose abandonment so that it can be acted upon by June 23.

Elimination of bus competition in the city limits at a saving of $100,000.

Extension of one-man car operation to include 30 per cent of the lines at a saving of $150,000 annually.

Rearrangement of schedules on all lines at an estimated saving of $136,000 a year.

Placing a new power rate in effect which would save the railway $76,000 a year without jeopardizing the case of the city or the company now before the State Public Utilities Commission.

The decision in the power case is expected very soon. If the state commission refuses to take jurisdiction then the city's action in Common Pleas Court will go forward. Through this case the city is attempting to secure a refund of $200,000 alleged overcharge for power from the Toledo Edison Company, under the contract in the Milner ordinance.

Buses Ruled Out at Duluth

Voters of Duluth, Minn., at a special city election on June 16 adopted an ordinance to regulate buses, the practical effect of which will be to bar local buses from the use of the streets. The vote was 10,354 for and 7,639 against, with ten precincts missing. The ordinance provides that all motor vehicles carrying passengers for hire, except taxicabs, vehicles engaged in the livery business and buses operated between Duluth and other municipalities, shall be prohibited from operating upon any street where double street car tracks are maintained. The Duluth Street Railway was active in the campaign in favor of the adoption of the ordinance.

Identification Cards in Muscatine Advanced Fifty Cents

The price of car rides for patrons using monthly identification cards in Muscatine took a jump when the City Council, by a vote of five to two, granted the Clinton, Davenport & Muscatine Railway permission to raise the rate for cards from 50 cents to $1 a month. The new rate is an average increase of from 6 to 7 cents for patrons using at least fifty tickets each month. Fare without tickets remains at 10 cents.

The company has agreed to continue workmen's and children's tickets. Permission was also granted the company to resurface between the tracks on Mulberry Avenue from Second to Seventh Streets, the work to be the same as that done on Second Street, on the condition that the workmen's monthly tickets, now sold for 5 cents and good only two hours in the morning and two hours in the evening, be continued instead of abandoned as proposed by the company, and that the tickets giving children two rides for 7 cents remain the same instead of being discontinued, as asked by the company.

Increased Wages in Springfield, Mass., May Mean Higher Fares

With a view to adjusting the income of the Springfield Street Railway, Springfield, Mass., to the requirements imposed by the arbitration award of June 11, when an eight-hour day and increased pay were granted to the employees, President Clark V. Wood and Vice-President Howard R. Whitney of the company met with Mayor Edwin F. Leonard and the transportation committee of the City Council June 16 and discussed tentative plans to increase fares from 7 cents to 10 cents, with tickets at reduced rates. For tickets a three-for-a-quarter rate is under consideration. The price for school children's tickets would be brought to 5 cents, as against 3½ now.

Reports that a sweeping introduction of one-man cars in the city was imminent were denied by President Wood. He said that present plans called for a maximum of fifty such cars in use at any one time, as against thirty-five at present. On some of the one-man cars two operators will be employed during the busiest periods.

Plans of the company, President Wood explained, look to bringing in $300,000 more revenue yearly. He said that owing to the business depression the gross income of the Springfield company during five months and twelve days had dropped $138,815, while the back pay of the men under the recent award will amount to $129,000. Mayor Leonard and Chairman John D. Shuart of the transportation committee expressed the view that it would be better for the public to have the fares increased than to have the service curtailed.

Wage Issue Deadlocked

Negotiations looking toward a settlement of wages affecting the employees of the Connecticut Company, New Haven, Conn., have been going on for some time with the result that the employees and officials are deadlocked, although the agreement relating to working conditions has been signed.

It developed that in an effort to bring about a settlement of the question of wages, the conference board recently submitted for referendum vote the question of giving the board power to go to the company with a proposition to sign up the agreement for an increase of 1 cent above the present scale, making it 58 cents an hour instead of 57. The referendum vote refused to give the conference board this authority and so matters stand just as they were, the trolleymen not receding from their demands for 75 cents an hour for operators of two men cars and 90 cents an hour for one-man car operators.

The Connecticut Company insists existing conditions demand that wages be permitted to stay where they are and the conference board is without authority to do anything but insist on the 75-cent wage agreement.

Detroit Must Arbitrate

Circuit Court So Rules in Wage Case—City Announces Appeal—Negotiations to Continue

Circuit Court Judge Theodore J Richter on June 13 granted the mandamus asked by the union in Detroit to compel the Detroit Street Railway Commission to arbitrate differences regarding wages and working conditions. Plans were made immediately by the commission to appeal the case to the Michigan Supreme Court. The D. S. R. management will also proceed with its plans to deal with the rank and file of platform men through the employees' committee elected by the men in the carhouses. It has been announced by the commission that it will continue to ignore the union pending the Supreme Court ruling.

The writ ordering arbitration in the controversy was asked by the men following the failure of their union officers to gain recognition from the street railway management or to secure acknowledgment of or action on the demands submitted. The mandamus proceedings allayed the threatened strike and several months may elapse before the Supreme Court hands down a decision. In the meantime the railway management will proceed with its negotiations with the men through the employees' committee.

It is expected that the charter clause providing for the arbitration of disputes between the commission and its men will be one of the points of attack by the attorney for the commission. Attorney Wilcox, for the city, held that this provision is unworkable and unconstitutional. The clause in the city charter is as follows:

In case of a dispute over wages or conditions of employment, said board is hereby authorized and directed to arbitrate that question or questions, provided each party shall agree in advance to pay half of the expenses of such arbitration.

Judge Richter stated that he would have hesitated to hold the charter provision good were it not for the fact that the commission arbitrated with the men in 1923. This, he said, gave a practical construction to the charter provision.

The questions involved in the matters before the court were outlined by Judge Richter in his opinion as follows:

1. Do the petitioners in this case duly represent the platform employees of the Department of Street Railways in, as is designated in said resolution of Feb. 7, 1923, their associated capacity?
2. Is there an arbitration provision in the charter and is it workable?
3. Were proper demands made for the refusal of which mandamus will lie?

In his opinion the judge said in part:

1. That these petitioners truly represent the platform employees can, I think, hardly be questioned. Continuously since Feb. 7, 1923, they and their predecessors have without question represented the platform employees in their dealings with the Department of Street Railways and its managers. It is my judgment that within the provisions of the charter and within the provisions of the resolution of Feb. 7, 1923, and according to the course of conduct had between the platform employees on the one side and the Department of Street Railways on the other in the past, the petitioners here do in truth and in fact represent the platform employees.
2. The charter provision does exist. It provides for arbitration when disputes arise. This provision is a part of the same basic law creating the respondent commission. It was put in the charter for a purpose. It is true that the charter provision in and by itself does not provide the machinery of arbitration, but in the past, in recognition of the charter provision and in recognition of the necessity for the machinery, those in authority promulgated the resolution of Feb. 7, 1923, set up the machinery to be employed in arbitration and proceeded to arbitrate under it. The men are seeking to avail themselves of it. The department claims that it is not bound to arbitrate except as, when and how it chooses. It is my opinion that the course of conduct between the parties, and the proceeding since the promulgation of the resolution of Feb. 7, 1923, have provided the machinery which makes the arbitration provision in the charter effective, and I so hold.
3. The demands were made on April 22, 1924. They were prompted in part by the request of the assistant general manager of the Department of Street Railways as to whether there would be any demands by the platform employees. This he wanted to know for the purpose of his budget. The demands were made at a time when the resolution of Feb. 7, 1923, was in full force and effect, and the respondents realized that, as shown by the testimony when they sought, on May 24, to rescind the resolution of Feb. 7, 1923. It is contended that the resolution of Feb. 7, 1923, is not binding upon the city without the approval of the Mayor or Common Council. This agreement of Feb. 7, 1923, is an employment contract with each employee working thereunder, providing for his working conditions and methods and means of adjusting them. It is not necessary that it be approved by either the Mayor or the Common Council.

It is next contended that the resolution expired under the terms of the arbitration award of Aug. 18. This is not true, as the arbitration award was made in pursuance of and became a part of it.

During the progress of the case the court suggested a means of arbitration which it believed would satisfy all. In furtherance of this suggestion the court granted the parties more than a week's time to agree. It says that it was from time to time informed by the attorneys for both sides that progress was being made toward a settlement and toward securing the means of arbitration. At that time the court had heard only a small portion of the testimony and had not heard the argument and had no opinion either way on the merits of the controversy, but believed that it had provided a suggestion which would have settled the question satisfactorily.

Jamaica-Babylon Electrification Under Way

Actual work in connection with the Long Island Railroad's plans to electrify its double-track line between Jamaica and Babylon, a distance of 28 miles, began a few days ago with the installation of the ties used for holding the third rail. Over 30,000 of these ties have been ordered and they are now being delivered.

Orders for third-rail sections have been placed to the extent of about 6,000 tons, and a substantial tonnage has already been shipped from the steel mills. Jumper cable and conduits to be used at street crossings, third-rail insulators, protection board and fittings and other necessary third rail material have been ordered, including about 37,000 track rail bonds. Manufacturers have promised early delivery.

All poles, cross-arms and fittings for transmission lines have been ordered. Some of this material has been received and other consignments are now in transit.

Equipment for the six substations to be erected at Laurelton, Lynbrook, Freeport, Wantagh, Amityville and Babylon has been ordered and the construction of these buildings will commence in the near future.

Equipment has been ordered for changing the present system on the Montauk Division to Babylon.

With the exception of the substation buildings proper, the work will be carried on by the company's own construction forces.

Final Hearing June 26 on Queens Line Fare Plea

General Lincoln C. Andrews, receiver, and officers of the New York & Queens Railway, Long Island City, N. Y., made formal request in person on June 19 to the Transit Commission for permission to charge an increased fare. Unless the commission consents, Justice Joseph Aspinall of the Queens Supreme Court has declared that on June 26 he will grant the receivers' petition for the scrapping of the lines and the forfeiture of the franchises.

General Andrews proposed that the lines should be permitted to exact temporarily a 10-cent fare from casual passengers, but that regular riders should have the privilege of buying company tokens at the rate of four for 25 cents, each good for a ride. The commission could determine after a trial of the plan just what would be a tariff at cost.

The final hearing will be held on June 26.

No Large Scale Pennsylvania Electrification at Present

Plans for the electrification of the Pennsylvania Railroad from New York to Philadelphia, from Philadelphia to Washington and from Philadelphia to Pittsburgh are under way, according to a representative of the company, but the "general railroad situation and the inadequacy of available funds make improbable the beginning of electrification work on a large scale in the near future."

This statement was made as the result of inquiries concerning the connection between the Conowingo power development and the Pennsylvania Railroad. When the decision to build this $60,000,000 electrical plant was announced recently the statement was made that it was to be used in supplying power for the Pennsylvania Railroad from Philadelphia to Washington.

Officials of the Pennsylvania did not deny the eventual possibility of an electrification, but they took the position that there is no telling when the plan can be carried out. The chief obstacle to such an improvement, it was stated on June 16, was the lack of funds.

Will Substitute Buses

The Janesville Traction Company, Janesville, Wis., has informed the City Council that it will abandon service on its Washington Street line in favor of a bus system. The company states that this step would be more practical than paying for the extra cost of paving between its tracks on Washington Street, which section was included in the city's 1924 paving program. Incidental to this action, the company also has under consideration a proposal to extend its bus service through the Blackhawk district on the east side, which territory is without any public form of transportation at present.

New Parking Regulations Proposed in Baltimore

New parking regulations covering all vehicles have been prepared for Baltimore by Charles D. Gaither, police commissioner, and submitted to Mayor Howard W. Jackson for his approval. The Mayor will make a study of the rules and if he approves them they will probably become effective on July 1. The United Railways & Electric Company and the bus companies operating in the city are much interested in the new rules.

One of the proposed regulations provides that no vehicle shall be permitted to stand longer than actually necessary to take on or discharge passengers, freight or merchandise on any street having tracks, within 75 ft. of any corner where cars take on or discharge passengers, or at any point where such standing vehicle may interfere with the free turning of a car from one street to an intersecting street, or with the free passage of any such street car along or across any street, or within 25 ft. of any intersecting curbs where there are no car stops, or opposite any safety zone, or within 20 ft. of the end of any safety zone. Another rule would use the trolley poles of the United Railways & Electric Company for the display of conspicuous signs setting forth the regulations at that particular point in the downtown section of the city.

Most of the rules deal with the business section of Baltimore. On some of the streets parking for a longer period than to receive or discharge passengers, freight or merchandise is prohibited entirely between 7:30 a.m. and 6 p.m. On others in the central section the prohibited hours are from 7:30 to 9:30 a.m. and 4:45 to 6 p.m. Parts of certain streets are designated as through streets with special parking regulations.

On many of the streets upon which it is proposed to make changes in the present parking rules the new regulations are not to apply on Sundays, holidays and after 2 p.m. on Saturdays.

Veteran Employees of Bamberger Electric Made Directors

As a reward for their many years of service and in recognition of the knowledge they have gained during the long periods of practical experience in the operation of the Bamberger Electric Railroad, Salt Lake City, Utah, five veterans in the company's employ were recently named members of the board of directors. The combined term of service of these men with the road is 108 years. Their election to the board took place at the special meeting of stockholders held on June 3.

The veterans named as directors are: John W. Walsh, vice-president, eighteen years of service; J. B. Bean, secretary, twenty-six years; N. S. Wiltsie, general superintendent, fifteen years; R. B. Needham, traffic manager, sixteen years, and E. A. Vail, chief engineer, who has been with the company for the past thirty-one years.

Julian M. Bamberger, president and general manager, was chosen to serve with Mr. Walsh and Br. Bean as a director for three years. Mr. Walsh was named vice-president and Mr. Bean secretary. Mr. Wiltsie and Mr. Needham will serve on the board for two years, and former Governor Simon Bamberger, treasurer of the company, and E. A. Vail will serve one-year terms.

Pittsburgh Baseball Dashers Have Dash

"If it doesn't draw attention it isn't an advertisement." This is a well-known advertising axiom very often overlooked. Not only is it the motto of the commercial department of the Pittsburgh Railways, but it is put into practice by the company. In calling attention to ball games many electric railways have for years been content to run "Baseball Today" or some similar calm statement on the dashers,

Caricature Picturing "Rabbit" Maranville in Action

ignoring the popular appeal in the personalities of the players. Every league team has stars at bat or in the field, or both, who are good copy. In the case of the Pittsburgh Pirates "Rabbitt" Maranville is known all over the circuit for his antics on the field and as a sterling player, bar none. It is intended to use this player personality for striking publicity just as the stars in the movies or theatrical world are played up by house owners as drawing cards.

Probably twenty-five men, or whatever the player limit is, will still be cavorting about on Forbes Field by the middle of the summer. They will represent the survival of the fittest in a hard competitive test. A few rookies and many oldtimers will find themselves battling side by side. As the season goes on memories of the fans about the personalities of the older men will be revived by the railway in its posters and striking characteristics of the new players will be presented. Ball players are human. They crave praise. The act of an individual now and then among them may arouse censure, but by and large ball players are a very human lot, prompted by the same hopes, desires and ambitions that characterize humanity in general.

So the Pittsburgh Railways has started with Maranville as the first subject of its posters. Other players will be pictured skillfully in characteristic poses. The cost of the posters with the distinctive appeal is very little, if anything, more than that of the non-illustrated kind. As between the appeal that pulls and the mere formal announcement the Pittsburgh Railways found that the management of the Pirates, which pays the bill for the posters, fell in with the new idea at once and heartily.

Springfield Jitney Men Pin Hope on Political Overthrow

Judge Wallace R. Heady at Springfield, Mass., has continued from day to day the cases of Thomas M. Brunton and George Mallis, convicted jitney drivers.

Richard J. Talbot, counsel for the jitney men, says it would be possible for the bus men to take their case to the Supreme Court and ask for a decision on the right of the transportation board to issue licenses, but with the City Council in its present condition, they would have little to gain by the move. He believes that the question whether the independent buses are resurrected lies now wholly with the voters, and he looks to the coming municipal elections to change conditions.

Mr. Talbot issued a statement in which he said:

> The right of appeal does not arise upon a continuance from day to day, but only if and when a case is finally disposed of by sentence. I do not anticipate any disposition which will make an appeal advisable, for the bus operators have followed the suggestion of Judge Heady and discontinued operation.
>
> The court has not decided that the free operation of a bus is unlawful. We have never contended that unlicensed buses could be operated for hire and did not anticipate that the public would refuse to ride free during the period of protest.
>
> If bus service is to be restored it must be under settled conditions which will allow the operators to replace their vehicles with up-to-date equipment worthy of this progressive city. The privilege of granting such a right rests with the people through their chosen representatives. Unless that right is made secure by the present officials, or the City Council to be elected in December, no operator will invest his funds in expensive equipment. We have made the best fight that we knew how to make against forces the strength of which no man of experience will underestimate.
>
> The problem of restoring service is now with the voters, who I believe will vote as they talk. If they do the restoration of independent bus service is only a matter of time.

Settlement Agreement Reached in McKeesport

The city of McKeesport has settled claims against the Pittsburg Railways amounting to $100,000 on the basis of the payment of $75,000. The terms of the settlement include an agreement on the part of the railway to do considerable paving in the city within two years.

The agreement provides for payment by the company to the city of $25,000, within thirty days, the remainder, $50,000, to be paid in ten equal installments without interest. The city is to discontinue all suits against the company and to accept $5,000 a year as a

franchise tax, instead of $10,000 a year, for three years, including the current year, after which a new agreement may be made. The railway is to make certain improvements during 1924 and 1925. The terms of the agreement are subject to approval by the Public Service Commission.

The agreement ends a long fight. The franchise tax alone amounted to $66,000. It accumulated while the company was in the hands of receivers, when the United States District Court refused to order receivers to make payment to the city.

News Notes

Publication Reappears.—The United Railways "Bulletin," published monthly for distribution among the employees of the United Railways, St. Louis, Mo., made its reappearance with the June issue after six months of suspension due to the death of its editor, William Vincent Brumby. The new editor is R. C. Rogers.

Bus Service Extended. — The Winnipeg Electric Railway, Winnipeg, Canada, will put two new bus services in operation. One of these services will operate on Archibald and Provencher Streets in St. Boniface and the other will serve territory on St. Mary's Road.

Sunday Excursions Advertised.—The Kentucky Traction & Terminal Company, Lexington, Ky., is arranging Sunday boat-trolley trips this summer. The round trip rate of $1 includes a 34-mile boat ride along the Kentucky River and a 56-mile trolley ride through Lexington and Frankfort. The company is advertising the trip extensively.

Conferences on Wages.—The Boston Elevated Railway, Boston, Mass., is engaged in daily conferences with representatives of the carmen's union about wages and working conditions. The men have submitted a demand for an increase of about 25 cents an hour, raising the maximum to 95 cents an hour, and the company has requested the men to take a reduction of 5 cents an hour. There are other conditions involved, such as a six-day week and vacations.

Special Excursions to Celebrate Rehabilitation of Indiana Road.—A novel traction trip for the purpose of acquainting patrons of the line with new cars and other facilities recently put into service was made recently by the Indianapolis & Cincinnati Traction Company on the Greensburg division. The excursion was offered at 50 cents for the round trip, any distance, either direction and on all trains. Not more than seventy-five passengers were permitted on any one car. A similar trip on the Rushville division is planned soon. Special permission was granted the company by the Public Service Commission to make the reduced charge for the day. On June 16 officers and invited guests were taken over the road in a special car to celebrate the rehabilitation of the line. The tour was in the nature of a twentieth anniversary and marked the completion of the change-over in operation from alternating to direct current.

"Rylite" Chosen.—The name of the new magazine which is to be published monthly by and for the employees of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is the *Rylite Employees' News*. J. H. Pritchard submitted the accepted name. He will receive the $25 prize. Mr. Pritchard is employed as distribution superintendent in the line department. The contest for a name was started in May. In all 321 entries were received. The company has now started another contest offering $20 in cash prizes to employees for the best constructive suggestions.

Freight Business on the Increase—A recent report made public by the Illinois Traction System, Peoria, Ill., operating the largest electric trunk line railway in the world in Illinois, shows that during the year 1923 the road handled 46,067 cars of freight, representing close to 1,850,000 tons. The freight business of the system has been steadily increasing from year to year. In 1921 the system handled 32,000 cars and in 1922 a total of 37,000 cars were hauled.

Permit Granted.—The Atlantic Coast Transportation Company, a subsidiary of the Atlantic Coast Railway, Asbury Park, N. J., has been granted a permit to operate at that place and also to operate a double-deck sightseeing bus. The company will establish a terminal at the foot of Asbury Avenue, Asbury Park.

Gets Increased Fare. — The City Council of Colorado Springs, Col., has sanctioned the Colorado Springs & Interurban Railway's plea and awarded a 10-cent fare but added a proviso that the company must issue weekly passes costing $1.25 each. These tickets are good for as many rides as the holder cares to make during the week specified. The Council's grant will be effective after approval by the State Public Utilities Commission. President Strickler had notified the city officials that unless the company was permitted to increase its fare it could not operate; that a 10-cent fare was absolutely necessary.

Wants to Operate Boston-Lowell Bus Line. — The Eastern Massachusetts Street Railway, Boston, Mass., has applied to the Massachusetts Department of Public Utility for permission to operate buses from Park Square, Boston, to Lowell, Mass. The department several weeks ago granted a general order to the road to operate buses under which the company must apply for specific routes. The bus trip between Boston and Lowell will be made in less than an hour and a half and the fare for a single ride will be $1.

Consideration for Public Wins Praise.—In constructing a strip of new track past the police station, city hall, county building and business establishments the Grand Rapids Railway, Grand Rapids, Mich., is making special efforts not to interfere with traffic during the period in which the street is torn up. This effort brought commendation in the Grand Rapids *Press* of June 5 under the caption, "Considering Traffic on Street Jobs."

City Council Favors Increased Rates.—The Eugene City Council has adopted a resolution petitioning the Oregon Public Service Commission to grant the Southern Pacific Company a 7-cent fare on its railway lines in Eugene, Ore., an advance of 1 cent, and to authorize the company to sell four tickets for 25 cents. In return for this resolution the company agrees to put in standard concrete pavement between the tracks of its lines at any place in the city where streets on which its lines extend are to be paved in the future.

Seeks Increased Fares. — Increased cost of transportation and decrease of patronage were cited by Frank H. Shaffer, attorney for the receiver of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, before the Cincinnati Council committee on street railroads for an increase in the cash fare from 7 to 10 cents. The ticket rate of 6¼ cents is to be continued. The rate of fare is for that section of the system between Anderson's Ferry and the west corporation line of Cincinnati. The existing rate of fare expires on July 9 and the interurban company seeks a new rate for the next two years. Residents of the district served by the traction company informed the Council committee that they preferred a 7½-cent ticket rate and 8-cent cash fare. Mr. Shaffer, however, informed the committee that the 10-cent cash fare would be paid only by the excursionist and the casual rider. The question was taken under consideration by the committee.

May Operate One-Man Cars. — The Reading Transit & Light Company, Reading, Pa., has applied to the Public Service Commission to set aside the general rule which requires a member of the crew to alight and proceed ahead of the car at points where the railway tracks cross steam railroad tracks. It is said that abolition of this ruling will result in the operation of one-man cars in Lebanon.

Buses Permanently Enjoined.—Vice-Chancellor Buchanan at Trenton, N. J., recently made permanent the injunction against George Zellers, Sr., George Zellers, Jr., Frank Sidone and Louis Annello operating their buses on a route paralleling the line of the Millville Traction Company, Millville, N. J. The proceedings were instituted by the Board of Public Utilities Commissioners, which had issued orders directing that the defendants cease operation, but which was ignored. The injunction proceedings in the Court of Chancery followed. Annello was also charged with violating the order of the Chancery Court and he was cited to show cause why he should not be adjudged in contempt. Appearing for the commission on June 3, Thomas Brown said that counsel for Annello admitted that he was guilty of a violation of the court's order in that he had operated on the line of the railway for a distance of 300 or 400 ft., but did not take on or discharge passengers on the railway route. There was no intention, according to counsel for the defendant, to ignore the spirit of the order. The court adjudged Annello guilty of contempt and fined him $25.

Financial and Corporate

Market Street Net $1,195,566

San Francisco Road Shows Increase of 18 per Cent in Net Over 1922 —Gross Up 2.35 per Cent

During the year ended Dec. 31, 1923, the gross earnings of the Market Street Railway, San Francisco, Cal., showed a susbtantial increase over 1922, with the exception of the earnings for the month of June, which were approximately $25,000 less than June, 1922. This was principally due to the fact that during June, 1922, the Shriners held their large convention in San Francisco, which it was estimated increased the receipts for the month by more than $30,000.

The increase in gross earnings for the year was 2.35 per cent. It is attributed principally to the normal increase in the population of San Francisco, although the increased use of automobiles has affected adversely the rate of increase in the gross earnings.

On April 29, 1923, there was a horizontal increase in the wages of the platform men. This is reflected in an increase of $112,450 over 1922 in the cost of conducting transportation and traffic. Offsetting this, however, was a decrease in the cost of power amounting to $96,251. The total operating expenses for the year were $12,596 less than for the year 1922, and the net income from operation after all charges including interest on the debt, but before deduction for federal income tax, increased $272,884 or in excess of 18 per cent over the preceding year.

Notwithstanding the increase in the wage scale the labor turnover for the year was materially greater than in 1922, principally accounted for by the fact that industry generally in California was much more active and the demand for labor considerably greater than during the preceding year.

The company reports no deferred maintenance work. In addition to the ordinary repairs and replacements more than 24,000 ft. of single track were reconstructed and more than 33,000 sq.ft. of new asphalt surface laid, and more than 220,000 sq.ft. reconstructed. Approximately 50 per cent of the number of cars operated daily passed through the shops for general overhauling, and in addition, sixteen new car bodies were built and put into operation, thus adequately taking care of the increased travel.

It was deemed advisable to increase the capacity of the substations of the company so as to take care of the normal demands for power which may be anticipated for at least two years.

In December negotiations were started for the refunding of the $9,250,000 of 5 per cent first mortgage bonds and the $4,250,000 of 6 per cent collateral trust notes, both of which issues fall due in 1924. These negotiations culminated in the sale of $13,000,000 of 7 per cent first mortgage bonds, the proceeds utilized for the refunding of the old debt. The only funded debt outstanding now is the issue of $13,000,000 of 7 per cent bonds.

Charles N. Black, president of the company, says that the negotiations for the purchase of the company's property by the city of San Francisco have been carried on more or less spasmodically during the past year, but little real progress has been effected.

STATEMENT OF INCOME AND PROFIT AND LOSS OF MARKET STREET RAILWAY FOR THE YEAR ENDED DEC. 31, 1923

Operating Revenue:		
Passenger	$9,747,376	
Other	62,016	
Total		$9,809,392
Operating Expenses and Taxes:		
Operating Expenses:		
Maintenance of ways and structures	$587,487	
Maintenance of equipment	640,938	
Power (including disputed charges)	1,346,159	
Transportation and traffic	3,507,318	
General and miscellaneous	754,345	
Total operating expenses	$6,836,247	
Taxes (other than Federal income taxes)	617,100	
Total operating expenses and taxes		$7,453,347
Net operating revenue		2,356,045
Other income credits:		
Interest and dividends	$63,197	
Other	11,356	
Total		74,553
Gross income		$2,430,598
Income charges:		
Interest on funded debt	$727,457	
Depreciation of railroads and properties	320,000	
Provision for 1923 Federal income tax	153,578	
Other	33,997	
Total		1,235,032
Net income for the year		$1,195,566
Surplus, Jan. 1, 1923		846,042
Profit and loss credits:		
Cancellation of reserve for undeposited United Railroads of San Francisco bonds in reorganization agreement		$263,000
Profit on purchase and sale of company's securities—Net	22,139	
Other	921	
Total		286,060
Gross surplus		$2,327,670
Profit and loss charges:		
Dividends on prior preference capital stock	$697,200	
Federal income taxes for year 1922	138,682	
Refinancing expenses	50,826	
Other	9,465	
Total		896,173
Surplus, Dec. 31, 1923		$1,431,496

OPERATING STATISTICS OF MARKET STREET RAILWAY FOR YEAR ENDED DEC. 31, 1923

Passengers carried:	
Cash fares 5c each	193,331,018
Special car passengers	31,025
School and other tickets, 2½c	3,135,831
Other tickets, 5c each	17,176
Total revenue passengers	196,515,450
Free transfer passengers	63,761,055
Total revenue and transfer passengers	260,276,505
Free passes	583,736
Total passengers	260,860,241
Percentage of transfer passengers to revenue passengers	30.82
Passenger revenue per revenue and transfer passengers, cents	3.75
Car hours	2,821,324
Car miles	25,391,329
Miles of single track leased, etc.	18.51
Miles of single track owned	256.27
Miles of single track operated	274.07
Number of passenger cars owned	749
Per Cent of Operating Revenue	
Operating expense	69.67
Taxes (railway only)	6.29
Operating expense and taxes	75.96
Operating income	24.04
Non-operating income	.76
Gross income	24.80
Deductions from income	7.47
Net income	17.33

Lake Shore Power Controls Toledo & Indiana

Through the exercise of an option secured a few weeks ago the Lake Shore Power Company, recently incorporated at Toledo, now controls the Toledo & Indiana Railroad, operating between Toledo and Bryan, Ohio. The interurban line and the electric properties will be separated under the new ownership. The Lake Shore Power Company controls the Central Light & Power Company of Williams County, the Wauseon Light & Power Company and several subsidiary distributing systems in nearby small towns.

Officers of the Toledo & Indiana Railroad are now L. G. Van Ness, Cincinnati, president of the Maumee Valley lines and of the Cincinnati, Georgetown & Portsmouth Railroad; Charles T. DeHore, Cincinnati, of the General Electric Company, vice-president; LeRoy E. Eastman, secretary and general counsel; and Marion M. Miller, president of the Home Bank & Trust Company, treasurer.

Directors are Judge Jason A. Barber, Toledo, who served for many years on the board; L. H. Schroeder, vice-president of the Central Trust Company of Illinois, Chicago; James W. Marshall, vice-president of the Chicago Trust Company; L. B. Breedlove, chief engineer of the Chicago Trust Company, Chicago; A. B. Gebhart Bryan, and the officers of the company.

With the exception of Mr. Breedlove the same men are officers and directors of the Lake Shore Power Company.

The new interests control all but $36,000 of the $1,400,000 outstanding Toledo & Indiana stock.

Stock Sales to Employees a Success in Chicago

The campaign for the sale of $1,000,000 of prior preferred stock to the employees of the Chicago Rapid Transit Company, Chicago, Ill., has gone over the top and at the latest count the total sales amounted to $1,294,100 to 5,136 employees.

The second division of the stock sale, by which the company undertakes to sell $4,000,000 in stock to the Elevated riders, is now under way, with every employee of the company a salesman. The daily newspaper being published during the campaign points out that with all the employees working the issue would be exhausted if each employee sold eight shares.

Of the total employees who pur-

chased shares, with a dividend rate of 7.8 per cent, 794 subscribers paid in cash for 2,987 shares. The deferred payment sales amounted to 9,954 shares to 4,342 employees. Of the 5,700 employees of the company, it will thus be seen that only a few hundred did not take advantage of the company's offer to purchase at least one share of stock. The average holding of the employees, acquired during the campaign, amounts to slightly in excess of 2¼ shares per employee.

The third issue of the second volume of the "Stock Sale News," which has been published daily during the campaign, contained this announcement:

The board of directors of the Chicago Rapid Transit Company, at a meeting held Wednesday, June 11, declared the first quarterly dividend since the reorganization of the companies. This dividend will be paid at the rate of 65 cents a share on the first days of July, August, and September to stockholders of record on the third Tuesday of the preceding month. This dividend is at the rate of $7.80 a share a year.

Birmingham Employees Buy 959 Shares in Three Weeks

Within three weeks after the plan was started approximately one-third of the employees of the Birmingham Electric Company, Birmingham, Ala., had subscribed to preferred stock of the company. Subscriptions are continuing and four departments, it is stated, have already subscribed 100 per cent, that is, each member of the department has taken at least one share of stock.

On June 17 three weeks after the preferred stock was first offered to employees, a total of 959 shares had been subscribed. The stock is no par value cumulative preferred and carries a dividend at the rate of 7 per cent a year. It is being sold to employees for cash at a price of $92 a share. On time payments the price is $97 a share, but after the first payment has been made, it is stated, dividends are paid at the regular dividend dates and no interest is charged on deferred payments.

Under the plan adopted, each employee may purchase up to ten shares of the stock, but not more than ten. Employees may, however, purchase up to ten shares for each member of their families, if they wish.

Daily bulletins are being issued showing the progress of the sales, and four of the seventeen departments have already reached 100 per cent in subscriptions. The Birmingham Electric Company has a total of 1,435 white employees, in addition to a number of negro employees. Several of the negro employees subscribed for from three to five shares.

In a letter to all employees of the company, published in "The Buzzer," weekly publication of the Birmingham Electric Company, J. S. Pevear, vice-president, expresses the hope that every employee will take at least one share of stock. He points out that the terms upon which it is offered are very liberal, and purposely so, for it is of benefit to purchasers of the company's securities to have the employees join them as investors.

"As owners of the stock," Mr. Pevear said, "we are going to look upon the company in an entirely different light, and aside from the satisfaction of having a good investment and the pride of partial ownership of the enterprise in which we are employed, we are also going to take a much greater interest in the daily conduct of its affairs."

Receiver for Michigan Road

Arbitrary Action of Village in Paving Matter Forces Representatives of Bondholders to Act

Stewart Hanley, Detroit, on June 17 was appointed receiver of the Grand Rapids, Holland & Chicago Railway, operating interurban lines between Grand Rapids and Holland. The action was taken on petition of the Continental & Commercial Trust & Savings Bank, Chicago, under the trust deed securing a $1,500,000 bond issue authorized in 1900. The receivership was precipitated, according to the petition, by the action of the village of Grandville in refusing to permit the company to operate cars through the village until the interurban has lived up to its agreement to pave between its tracks there.

Some years ago the village of Granville granted the railway company a franchise to operate cars over its streets, and with this franchise was an agreement on the part of the railroad to pave between the tracks when the village repaved the street and to use material in that paving similar to that laid by the village. About five years ago the village paved the street, but the company did not pave between the tracks, stating at that time that it could not obtain the material. Action by the village to compel compliance with the terms of the ordinance was delayed, but last year the village began suit in the Circuit Court at Grand Rapids to force the company to complete the work of paving. Judge Willis B. Perkins several months later granted the petition of the village and ordered the railroad to lay the paving. The company appealed to the Supreme Court of Michigan. That body upheld the findings of the lower court, refused the company's petition for a rehearing and ordered the company to begin paving by May 1 of this year.

On that date nothing had been done, but the village granted a thirty-day extension of time. On Saturday June 14, it took further action by erecting barricades at the village limits so as to block cars both east and westbound through the village. Passengers were thus forced to walk the mile stretch in the village.

Receiver Hanley in sixty days will report back to the court as to the progress. The company admitted all allegations in the bill and joined in the prayer for a receiver.

On the evening of June 17 the village had begun to lament at the consequences of its arbitrary action. It lifted the blockade which for three days has prevented cars from passing through the village. Service between Grand Rapids and Holland was resumed on regular schedule on June 18. Judge Sessions has stated he will authorize Mr. Hanley to issue receiver's certificates at once in order that money may be raised to pave between the tracks in Grandville this summer.

Bus Purchase Reported at St. Louis

An agreement has been reached by the reorganization committee of the United Railways and the owners of the People's Motorbus Company, St. Louis, whereby the bus lines are offered to the successor to the reorganized railways for $2,400,000. The terms of purchase said to have been agreed upon are: Holders of Class A to be paid $60 a share, which means $5 for the first year of operation and $5 additional profit. A payment of $300,000 is said to have been offered for all of the B stock, which brings the total to $2,400,000.

The bus company is now operating seventy-two buses on five lines.

Further progress is reported toward lifting the railway receivership. The reorganization committee for the railway has decided that the $30,300,000 United Railways general mortgage 4 per cent bonds maturing in 1934 should be allowed to run to maturity. In order to avoid default in these bonds it will be necessary to cause the interest due last January to be paid on or before July 1, 1924, as the mortgage permits a delay of only six months. This interest will be paid, together with 6 per cent for the use of the money during the past six months.

It is the opinion of the reorganization committee, publicly expressed, that the present bus system and the street railway system can be satisfactorily coordinated. The committee has no desire to see buses eliminated or to prevent expansion of the bus system.

As yet no settlement has been made with the Suburban bondholders, who are proceeding separately from other bondholders. It is expected, however, that it will be possible to effect a settlement by which the bondholders of the Suburban system can be protected and the system be maintained as a unit.

Both the city and the railway have appealed from the valuation handed down by the Public Service Commission of the State of Missouri. Here again it is hoped that a basis of settlement can be determined shortly through which the city will withdraw its opposition to the valuation, and the receiver of the railway will do likewise.

All these four matters are actively engaging the attention of the reorganization committee. They must be settled before any reorganization plans are definitely announced. It is hoped to determine all of them in the near future.

The Board of Aldermen of St. Louis, Mo., has turned over to its committee on resolutions a bill introduced by Alderman Wimer of the Twenty-seventh Ward which provides that the president of the board appoint a special committee of seven aldermen to interest themselves in negotiations being carried on for the reorganization. Mayor Henry W. Kiel has repeatedly stated that the city administration would not participate in the negotiations for the reorganization of the United Railways, but would await an application for a new franchise before indicating the city's attitude on the reorganization plans. The newspapers of the city have criticised the Mayor for this stand.

Proceeds of Chicago Issue for Refunding.—The proceeds of the sale of the $6,500,000 of Chicago Rapid Transit Company first and refunding mortgage gold bonds, referred to in the ELECTRIC RAILWAY JOURNAL for June 14, page 952, will be applied toward the retirement of $8,000,000 of first mortgage bonds of the South Side Elevated Railroad which mature on July 1, 1924.

Receipts More than Expenses.—The receipts of the Seattle Municipal Railway, Seattle, Wash., during the month of May totaled $519,502 and the disbursements $487,796.

$1,000,000 First Mortgage Bonds Offered. — Blodget & Company and Stone & Webster, Inc., New York, are offering at 93 and interest to yield more than 6 per cent $1,000,000 first mortgage 5½ per cent gold bonds of the Baton Rouge Electric Company, Baton Rouge, La. The bonds, known as series "A," are dated June 2, 1924, due June 1, 1954. The proceeds from the sale of this issue will be used to retire the existing debt of the company, including outstanding first mortgage bonds, called for payment on Aug. 1, 1924, and to provide additional funds for construction purposes. The Baton Rouge Electric Company does the entire electric lighting, power, gas and electric railway business in Baton Rouge.

Abandonment Decision Deferred.—Decision in the hearing before Commissioner Harry V. Osborne at the State House, Trenton, N. J. on the application of the Trenton & Mercer County Traction Corporation for the abandonment of service between Pennington and Hopewell was reserved for two weeks. In the meantime submission of the proposal will again be made at a public mass meeting to the Hopewell people and to the people residing within the affected districts. At that time a new plan will be submitted by the railway, which wants to operate buses between the two towns.

Authorizes Abandonment.—The Pennsylvania & Maryland Street Railway, Elk Lick, Pa., has been granted permission by the Public Service Commission to abandon its 5-mile line between Meyersdale and Garrett, Pa. The bridge material and trackage have been advertised for sale. The company has operated the trolley line since 1907, but with the improvement of the main highway between Meyersdale and Garrett and resultant bus service business on the railway fell off considerably.

Bonds Called for Payment. — All of the outstanding first mortgage 6 per cent serial gold bonds of the Portsmouth Street Railroad & Light Company, Portsmouth, Ohio, except $25,000 which mature July 1, 1924, have been called for payment July 1, at 102½ and interest, at the office of the Guaranty Trust Company. The total issue of the bonds is $325,000. They are dated July 1, 1914.

Surplus in Rochester.—The quarterly report for the operations of the New York State Railways for the period ended April 30, under the service-at-cost contract on Rochester trolley, trackless trolley and bus lines, shows a net surplus of $14,616 from combined operations. Although a steady gain in passengers is shown on the bus and trackless lines a deficit of $2,949 from the operations of the two lines is reported. The trolley surplus is $17,564. The Dewey Avenue Bus line, connecting the end of the Dewey trolley line with the suburb of Greece, and the cross-town trackless line, connecting a growing residential district on the south side of the Genesee River with the industrial area on the north side, are operated by a subsidiary company, the Rochester Co-ordinated Bus Lines, Inc.

Vote to Omit Dividend Payment.—The directors of the Rochester & Syracuse Railroad, Inc., Rochester, N. Y., recently voted to omit payment of the quarterly dividend on June 15 on the 6 per cent non-cumulative preferred stock. From March 15, 1921, to March 15, 1924, inclusive, quarterly dividends of 1 per cent were paid on this issue.

Authorized to Execute Payment Deeds.—The Key System Transit Company, Oakland, Cal., has been authorized in supplemental orders by the Railroad Commission to execute mortgages or deeds of trust to secure payment of $229,000 of first mortgage 6 per cent bonds due July 1, 1938, and $236,000 of similar bonds.

Director Chosen.—John P. Frenzel, an Indianapolis financier, was recently elected a director of the Indianapolis Street Railway, Indianapolis, Ind., to fill the vacancy caused by the death of Dr. Henry Jameson, formerly chairman of the board.

Utah Interurban Had Profit in 1923.—The Salt Lake & Utah Railroad, Salt Lake City, Utah, was operated during 1923 at a net profit of $69,449, according to the annual report filed with the Public Utilities Commission. The company paid $36,450 in dividends. Operating revenue was $877,461, an increase of $124,969 over the preceding year. Operating expenses were $532,811, an increase of $55,603 over 1922. Taxes on equipment and railroad property were $69,912 and interest on equipment notes and other outstanding notes was $160,400. The road's passenger revenue was $335,975, a gain of $12,386 over 1922. Freight revenue was $482,137 for last year, an increase of $100,817.

Suffered Loss of $447. — For the calendar year 1923 the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., suffered a loss in its balance account of $447. In 1922 the company realized a surplus of $21,318. Passenger earnings for 1923 were $232,222, against $247,636 in 1922. The total gross earnings were $461,819 in 1923 and $468,903 in 1922. Operating expenses showed an increase from $292,466 in 1922 to $312,399 in 1923. The line operates 40 miles of track, connecting Kansas City, Kan., Edwardsville, Bonner Springs, Linwood and Lawrence, with an additional 30 miles projected to extend to Topeka.

Accumulated Surplus in 1923 $160,752.—The Pacific Coast Railway, operating from Port San Luis, Los Alamos, Santa Maria and Guadalupe, reports to the California Railroad Commission for the year 1923 that its operating revenue was $162,541 and operating expenses $187,842, giving a net operating loss of $25,301. Miscellaneous non-operating revenue amounted to $59,589. Interest, rent, taxes and other deductions totaled $93,935. The net corporate loss for the year was $62,646. The surplus at the beginning of the year amounted to $223,858. Miscellaneous additions to surplus for 1923 amounted to $454 and miscellaneous deductions were $913, leaving an accumulated surplus at the end of the year of $160,752.

Order of Dissolution Filed. — The Empire United Railways, Syracuse, N. Y., has filed, through its attorney, with the Secretary of State an order for dissolution.

Reorganization Plan in Effect.—The holders of the first and refunding mortgage 5 per cent thirty-year gold bonds of the Buffalo & Lake Erie Traction Company, Erie, Pa., were recently notified that the reorganization committee had declared the plan of reorganization operative and effective. The reorganization plan was outlined in the ELECTRIC RAILWAY JOURNAL, issue of April 19, 1924.

Bonds Sold. — Drexel & Company, Philadelphia, have sold at 98 and interest to yield about 6.15 per cent, $3,000,000 of 30-year 6 per cent general mortgage gold bonds of the Georgia Railway & Power Company, Atlanta, Ga. The bonds are known as series of 1924. They are dated April 1, 1924, and are due April 1, 1954. In a letter from H. M. Atkinson, chairman of the board, it was stated that upon the completion of the new 20,000-kw. hydro-electric plant, which will be provided for from the proceeds of these bonds, the company will have a total hydro-electric generating capacity of 160,000 kw. The purpose of the issue in addition to the 20,000-kw. development is to pay for additions to the generating and distributing system.

Permission Sought to Abandon Surface Routes. — Final hearings on the application of the Dry Dock, East Broadway & Battery Railroad, New York City, to abandon a portion of its route and franchise on First Avenue from Fourteenth Street to Thirty-fourth Street and on the application of the Forty-second Street Manhattanville & St. Nicholas Avenue Railway to abandon a portion of its route and franchise on First Avenue between Forty-second Street and Thirty-fourth Street were held on June 9 by the Transit Commission. Decision was reserved.

Abandonment Authorized. — The Pennsylvania Public Service Commission has granted the Scranton Railway permission to cease operation from the boundary line between the Township of Lackawanna and the Borough of Moosic on the north, to the intersection of Main and Broad Streets in the city of Pittston, on the south. The commission said that in the light of the overwhelming and practically uncontradicted evidence with respect to the operating losses which had been sustained on the line for years; with respect to the additional capital which must be put into the system to place it in safe operating condition; with respect to the lack of necessity of continued operation of the line and to the adequate transportation facilities now serving the communities, it believed that the proposed abandonment was proper for the convenience of the public. The length of line abandoned is about 8 miles.

Terms of Power Deal Reported Met.—It is understood that so far as the owners are concerned the way has been cleared for the consummation of the deal under which the American Gas & Electric Company and the Appalachian Power Company are seeking control of the American Electric Power Company. One of the conditions of the offer of $62.50 a share for the common stock of the American Electric Power was that 75 per cent of the 189,200 shares be deposited for delivery to the purchasers against payment. This condition is understood to have been met. Several important railways are included in the holdings about to change hands. The most recent development publicly reported in connection with the deal is an intended inquiry into its terms by the Public Service Commission of Pennsylvania.

Talk of Canadian Utility Merger.—Plans are said to be rapidly developing for Montreal Light, Heat & Power consolidated interests taking over the entire group of Robert companies, including Quebec-New England Hydro-Electric Corporation, Canadian Light & Power Company, Montreal Tramways & Power Company and Montreal Tramways. It is proposed to form a holding company whose capital, it is understood, will be $20,000,000.

Dissenting Stockholder Seeks Greater Consideration.—Thomas E. O'Shea, a stockholder of record in the New York Railways, New York City, has petitioned the Transit Commission requesting that before proceeding further in its hearings upon the reorganization plan of that corporation the commission subpœna the Guaranty Trust Company to produce a list of the present holders of the company's refunding bonds. He asked also that "Harry Bronner's reorganization protective committee be compelled—through subpœna, if necessary—to disclose to the commission the names of the bondholders whom it represents, the number of bonds held by each bondholder, the dates of the purchase thereof and the prices paid by them in each instance." Stripped of its verbiage Mr. O'Shea's plea is a protest seeking greater consideration for the stockholders of the company under the terms of the proposed reorganization.

Brooklyn Company's Preferred on Regular Basis.—At the board meeting of the Brooklyn-Manhattan Transit Corporation on June 16 the second dividend of $1.50 a share on the preferred stock was declared, and it was learned that the company has adopted a policy of declaring regular quarterly dividends in the future. When the first preferred dividend was declared last April, the directors intimated that this first payment did not constitute the inauguration of regular dividends, but was more in the nature of interest on money contributed by the stockholders to make possible the reorganization. The company has made such progress, however, that it was able to place the shares on a regular dividend basis, the first of which has just been announced. Under the terms of the reorganization plan by which it succeeded the Brooklyn Rapid Transit the dividend on preferred shares does not become cumulative until July, 1925.

Personal Items

D. E. Blair Heads Canadian Association

Engineer of Equipment at Montreal and P. A. Y. E. Designer Honored

D. E. Blair, who was elected president of the Canadian Electric Railway Association at its annual convention in Ottawa on June 13, is one of the ablest of the younger group of executives of Canadian electric railways. When asked to tell his life history Mr. Blair modestly replied that it could be told in a very few words. For the past twenty-one years he has been superintendent of rolling stock of the Montreal Tramways. Prior to 1903 he held a similar position with the Quebec Railway, Light, Heat & Power Company,

D. E. Blair

which he joined in 1897, immediately after he was graduated from college.

But this does not tell the whole story. In the course of his work he has had much to do with the development of modern electric railway rolling stock. One of his earliest accomplishments in this line was the pay-as-you-enter car, which was designed under his supervision soon after he accepted his present position. The ability of the man is recognized not only in Canada but in the United States as well, and his popularity is attested by his elevation to the presidency of the Canadian association. At the recent meeting it was remarked that Mr. Blair was one of the two men present who had been at the first meeting of the association when it was founded, in 1904.

A native of Canada, Mr. Blair received his preparatory schooling in the Quebec High School, after which he took a course in electrical engineering at McGill University, receiving the degree of B.Sc. from that institution at the age of eighteen.

Whatever problem Mr. Blair attacks he pushes to completion with vigor, a characteristic which extends even to his avocations. In summer he is an enthusiastic tennis player. Since the development of the radio he has spent much of his spare time in the winter in the construction of radio sets. He is an enthusiastic radio listener at times, but his real interest is in securing the highest degree of technical perfection in the construction of the sets which he has built. Nothing but the *ne plus ultra* satisfies the man when working either as a professional or an amateur. Perfection in things mechanical is of course impossible, but if it were possible Mr. Blair would achieve it. Nothing less would satisfy him.

R. H. Filbeck was elected president of the Terre Haute Traction & Light Company, Terre Haute, Ind., at the recent annual meeting of the directors.

W. A. Robertson is now the new superintendent of the Jacksonville Traction Company, Jacksonville, Fla. He has been with Stone & Webster for about fifteen years. For the past several years Mr. Robertson has served as general superintendent of the Eastern Texas Electric Company, operating local and interurban lines in Beaumont and Port Arthur. He succeeds C. E. Bostwick, Jr., who, as noted in the ELECTRIC RAILWAY JOURNAL for June 14, has been made general manager of the White Stage Line Company, with headquarters at Tampa.

"Judge" and Mrs. S. D. Hutchins have just returned from a ten weeks' tour and vacation in Europe. Mr. Hutchins has been representative of the Westinghouse Traction Brake Company in the central territory for many years and is active in the affairs of the Central Electric Railway Association. For many years he has been chairman of the committee which arranges for the conventions of the association, and in that capacity is permitted carte blanche by the executive committee. The Judge was a little out of sorts physically when he went to Europe, and it is hoped that the errand of regaining his strength, on which his company sent him abroad, was accomplished 100 per cent.

J. F. Rodgers has resigned his connection as engineer with the department of way and structures of the Brooklyn City Railroad. Mr. Rodgers has long been engaged in electric railway work. Following the earthquake and fire in San Francisco he was assistant engineer in the rehabilitation of the property of the United Railways there. Before that he had been connected with the transportation department of that company. Subsequently he became connected with the Board of Supervising Engineers, Chicago Traction, as assistant engineer and later served with the Chicago Surface Lines as superintendent of track.

W. R. Huffer has been appointed traveling passenger and freight agent of the Indianapolis, Columbus & Eastern and the Columbus, Newark & Zanesville Railway. Mr. Huffer has been

associated in the past with the Western Ohio Railway at Lima. His headquarters will be the public relations department, Columbus, Ohio.

Travis H. Whitney in Brooklyn Post

Former Public Service Commissioner Elected Vice-President of Brooklyn-Manhattan Transit Corporation

Travis H. Whitney on June 16 was elected vice-president of the Brooklyn-Manhattan Transit Corporation, which a year ago succeeded the Brooklyn Rapid Transit Company. The position is one that has been open since the company was organized. During the last five years Mr. Whitney has been engaged in private practice of law, but he has maintained a close interest in transit matters and since last year has been very deeply interested in railway affairs, particularly in Brooklyn as a public director of the company of which he now has been elected an officer.

Mr. Whitney was with the Public Service Commission for the First District of New York for twelve years. He was appointed secretary in 1907 by the original Hughes Commission and served for nine years, when he was appointed and served as a commissioner until 1919. He was particularly in charge of transit development and construction in New York City during the war period when the major part of the new elevated and subway lines were constructed or completed.

G. M. Dahl, chairman of the executive committee of the Brooklyn company, has stated that as a public director nominated by the Transit Commission Mr. Whitney's point of view has been very valuable and helpful in promoting a better understanding between the company and the public, a result of the greatest importance to both. It is Mr. Dahl's belief that as vice-president, Mr. Whitney, with his point of view based on public needs, will have a still greater opportunity to promote understanding and confidence between the public on the one hand and the company and its investors on the other.

There is sound substantiation for this expression of opinion. It is, indeed, a rare background of experience that Mr. Whitney brings to his new position. The original Hughes commission with which he served was one of the first regulatory bodies of the kind, and with all due respect to the successor members on that body the commission as originally constituted was particularly notable for the ability of the individual members and the extremes of thought which the men composing the commission represented. Precedents which that body set in its deliberations have been written into the regulatory law of the land, and as secretary of the commission Mr. Whitney's ideas were not without influence on the deliberations of the first New York commission.

Aside from the formal work of the commission, however, Mr. Whitney was by the very nature of his post, first as secretary to the commission and later as a member of that body, in a particularly advantageous position to judge the problems confronting the utilities and to grasp the point of view of a public ever seeking increased and greater public utility facilities. Moreover, while Mr. Whitney was in public office the panorama of local politics was ever before him. To very few persons, indeed, are opportunities presented similar to those which Mr. Whitney has enjoyed in his public posts.

Mr. Dahl himself has at the back of him experience in commission work and is particularly keen in his appreciation of the complexity of the problems presented in dealing with the public. Moreover, since his connection with the company Mr. Dahl has been the principal spokesman of the company with respect to major public relations matters. Mr. Dahl's announcement of Mr. Whitney's appointment has been interpreted to mean that in the future the bulk of this work will be carried on by Mr. Whitney.

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T. H. Whitney

Mr. Whitney was born at Gentryville, Ind., on June 22, 1875. He was graduated from the Harvard Law School, and began the practice of law in New York City immediately thereafter.

Obituary

H. M. Swetland, Noted Business Publisher, Dies

H. M. Swetland, president of the United Publishers Corporation, which publishes *Iron Age, Dry Goods Economist, Automotive Industries* and other important business publications, died at his home in Upper Montclair on June 15. He was one of the pioneers of modern industrial publishing and had been a leader in raising journalistic standards through his activities in the Associated Business Papers. At one time he was owner of *Power* and of *Engineering and Mining Journal* (as it was then called), both now owned by the McGraw-Hill Company.

Mr. Swetland was born in Chautauqua County, New York, in 1853. In 1880 he came to New York as reporter and as subscription and advertising salesman of the *Boston Journal of Commerce*. In 1884 he became Boston representative of *Power*, later coming to New York and assuming the management of that publication. In this capacity, he was associated with James H. McGraw, now president of the McGraw-Hill Company, and Emerson P. Harris. The association was discontinued in 1888 when Mr. Swetland purchased *Power*, the ownership of which he retained until he sold the paper to the late John A. Hill in 1900.

For many years thereafter, Mr. Swetland gave his chief attention to the publication of magazines serving the automotive industry. In 1911 he organized the United Publishers Corporation, which brought together publications in the steel, automotive, building and textile fields. He was elected president of that corporation and retained that office to the time of his death. He was also president of the National Publishers Association, the Class Journal Company, the Federal Printing Company, the U. P. C. Realty Company and the Swetland Realty Company, and a director of the Commercial Trust Company.

Mr. Swetland's work and contribution to industrial publishing are well set forth in the following tribute paid to him by his life-long friend and former associate, Mr. McGraw:

> Mr. Swetland's success as a man and a publisher was due to a rare combination of personal qualities and business acumen. He was a tireless worker, had great penetration, concentration, and perseverance. He was an organizer of the first rank, and was always a co-operator. His ideals in publishing were high, service to the readers of his publications being his first consideration. The publishing business has lost an outstanding figure in the passing of Horace M. Swetland, but his work will endure in the great institutions to which he gave unstinted devotion, and in the lives of those whom he trained in the technique of publishing and encouraged to make the best of their opportunities.

Mr. Swetland not alone won for himself marked distinction in American technical journalism and in those industries which his papers served, but —what he prized more—the high regard and respect of all his very wide circle of associates, business and social. To these, his passing brings a keen regret.

Edward D. O'Brien, assistant superintendent of public utilities at Seattle, Wash., since 1919, died there recently, at the age of fifty-one years. Mr. O'Brien had been in the service of the city since March 1, 1909. He was a graduate of the Armour Institute of Technology in electrical engineering. He was also a lawyer.

Vincent J. Waltz, claims attorney for the Community Traction Company, Toledo, died at his home there on June 1, following an illness of eight weeks. He had been identified with the Doherty properties in Toledo and particularly the traction lines for the last fifteen years in claims work. He was one of the organizers of the Toledo Safety Council and its first president until he was forced to resign because of ill health a few weeks ago. Mr. Waltz was born in Cuyahoga Falls, Ohio, forty-eight years ago. He was graduated from Ohio Northern University at Ada.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Status of Copper Market

Big Increase in Copper Production and in Domestic Consumption During 1923

Smelter production of primary copper from domestic sources increased approximately 51 per cent in 1923 over 1922, according to statistics of the Department of the Interior. At the same time there was an even greater increase in the value of smelter production, which was approximately 64 per cent greater than the preceding year, due to the high prices prevailing during the first quarter. Smelter output in 1923 was 1,434,999,962 lb. as against 950,285,947 lb. in 1922. The average price of copper delivered during the year was 14.71 cents per lb., an increase of about 1.2 cents per pound over the average figure for the year before. There was a very great increase in domestic production of new refined copper from both domestic and foreign sources, the rate being higher in 1923 than during any previous year except the abnormal years of 1916, 1917 and 1918.

Year	Smelter Production (Domestic)	Refinery Production (Domestic and Foreign)	Imports (Unmanufactured)	Exports of Metallic Copper	Withdrawn on Domestic Account
1913	1,224,484,098	1,615,000,000	409,000,000	926,000,000	812,000,000
1914	1,150,137,192	1,533,800,000	306,000,000	840,000,000	702,000,000
1915	1,388,009,527	1,634,200,000	316,000,000	682,000,000	1,137,000,000
1916	1,927,850,548	2,259,400,000	462,000,000	784,000,000	1,479,000,000
1917	1,886,120,721	2,422,000,000	556,000,000	1,126,000,000	1,395,000,000
1918	1,908,533,595	2,394,000,000	576,000,000	744,000,000	1,662,000,000
1919	1,286,419,329	1,770,000,000	429,000,000	516,000,000	914,000,000
1920	1,209,061,040	1,526,000,000	486,000,000	623,000,000	1,054,000,000
1921	505,586,098	951,000,000	350,000,000	628,000,000	611,000,000
1922	950,285,947	1,256,000,000	541,000,000	743,000,000	897,000,000
1923	1,434,999,962	1,980,000,000	676,000,000	829,000,000	1,300,000,000

Domestic consumption has kept pace with production and except for the years mentioned was also at the highest rate, but because of unfavorable conditions in Europe, which have retarded consumption in the important consuming countries there, and because of the increased production in South America and Africa, which has tended to increase competition in European and other markets, stocks have increased and prices are still below what the producers had confidently expected they would be at this time. The producers have offset the low selling price of copper, so far as they have been able, by decreased costs of production. These decreases have been obtained by increased efficiency of operation, by improved labor, by consolidation of mining companies, by closer co-operation between producers and manufacturers.

The stocks of refined new copper have increased from 216,000,000 lb. at the end of 1922 to 264,000,000 lb. at the end of 1923, and stocks of blister copper and materials in process of refining have increased from 361,000,000 lb. at the end of 1922 to 432,000,000 lb. at the end of 1923.

During the year the Calumet & Hecla, the Ahmeek, the Allouex, the Centennial and the Osceola companies formed the Calumet & Hecla Consolidated Copper Company and the Kennecott Copper Corporation absorbed the Utah Copper Company.

Some salient figures of the copper industry are given in the accompanying table.

Startling Statistics of Material Consumption at Chicago

A statistically minded person would find much material for study in figures of the Chicago Surface Lines, prepared by the company's auditor, designed particularly to contrast conditions in 1914 with those that prevail now. Thus to the man in the street who hears an occasional squeal as a trolley car passes by it might appear that the company seldom did anything to ameliorate this condition. Company figures, however, show that it used 60,039 gal. of car oil in the year 1923, 38,597 lb. of gear grease and 15,026 gal. of compressor oil.

A flat wheel? The company turned 16,190 pairs of wheels in 1923 and 17,062 pair the year before, and at the same time renewed 7,824 wheels in 1923 and 6,600 the prior year.

A car not properly swept? The company wore out 16,731 brooms in one year and swept and disinfected 1,201,580 cars in the same period of time. The area of the glass in the company's cars is 1,476,525 sq.ft. or the equivalent of 34 acres.

The total heater capacity of the cars is 42,222,860 watts. The motors number 11,960 with a total horsepower of 505,710.

More than 1,625,000 trainmen's trip sheets were printed in 1923, enough to make a stack 677 ft. high, and a total of 1,822,094,000 transfers was printed, sufficient if placed end to end to extend for 145,586 miles.

Compared with this, the report of the Chicago Surface Lines reveals, there is $1.38 revenue received in 1924 compared with the dollar of a decade ago. Just as enlightening are the figures of the cost of track construction. Starting in 1914, with the mile costing $47,446 to the peak in 1920 when the same mile cost $107,232, the figure now stands at $93,785.

Railway Market for Buses Growing Fast

At present writing, 155 electric railways are operating at least 2,000 buses. The realization that there is a real field for buses in the hands of the present electric railway companies, which now see themselves as "transportation companies," embracing all kinds of transportation vehicles in the service for which each is suited, is spreading rapidly.

On the basis of its records of bus purchases to date and its knowledge of the thinking of railway men, the ELECTRIC RAILWAY JOURNAL sees the future market for buses in the electric railway field about as shown in the following table, taking the average cost at $7,000:

BUS SALES TO ELECTRIC RAILWAYS

1922	240*	$1,680,000
1923	621*	4,347,000
1924	2,000	14,000,000
1925	7,000	49,000,000
1926	15,000	105,000,000

*Actual

$75,000,000 Common Authorized by Westinghouse

The Westinghouse Electric & Manufacturing Company at its annual meeting on June 11 increased the authorized capital stock from $125,000,000 to $200,000,000. The additional stock will consist of common shares.

President E. M. Herr said business was quite satisfactory so far as the Westinghouse was concerned, "especially considering the tendency of business in general to slow up at the present time." Mr. Herr said that while the company's business also is somewhat less than for the corresponding period a year ago, the decrease has not been of sufficient volume materially to affect operations, and the company's commercial officers believe that it will improve in the fall—to what extent, of course, depending somewhat upon the result of the political campaign.

H. P. Davis, vice-president of Westinghouse Electric, and Loyall A. Osborne, president of the Westinghouse International Company, were elected directors to succeed W. H. Woodin and J. C. Bennett, retired. Mr. Bennett continues as secretary and controller of the Westinghouse Electric.

Metal, Coal and Material Prices

Metals—New York	June 17, 1924
Copper, electrolytic, cents per lb.	12.60
Copper wire base, cents per lb.	14.875
Lead, cents per lb.	6.925
Zinc, cents per lb.	6.17
Tin, Straits, cents per lb.	44.625
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.925
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N.Y., cents per lb.	17.25
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	$11.75
Turpentine (bbl. lots), N. Y., per gal.	$0.835

Rolling Stock

Third Avenue Railroad, New York, N. Y., has placed an order with J. G. Brill Company for fifty single-truck closed cars. Delivery will begin July 15 and will be completed by Sept. 1. These cars will have a length over all of 30 ft. 3½ in., a width of 8 ft. 2 in. and a truck wheel base of 8 ft. They will seat thirty-six people and weigh approximately 10 tons with all equipment. The car body is of all steel construction with headlining and is provided with arch roof. The equipment for these cars will be taken from some of the company's 500 type cars which are now in service and will include the McWhirter pedal control of the equipment and the air brakes.

Jamestown Street Railway, Jamestown, N. Y., is planning the purchase of eight or ten improved one-man cars for its Jamestown-Falconer line.

Lorain Street Railway, Lorain, Ohio, has ordered five new city cars of the Peter Witt type for its city lines.

Monongahela - West Penn Public Service Company, Fairmont, W. Va., expects on July 15 to receive the three cars ordered in April of this year. The specifications of these cars follow:

Builder of car body,	Cincinnati Car Company
Type	Single truck safety car
Seating capacity	28
Weights — Car body	8,000 lb.
Weights — Truck	6,500 lb.
Weights — Equipment	4,000 lb.
Weights — Total weight	18,500 lb.
Length over all	28 ft. 8 in.
Wheelbase	8 ft. 6 in.
Width over all	8 ft. 2 in.
Height, rail to trolley base	10 ft. 3¾ in.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Bronze
Axles	Carnegie A.S.T.M. Spec.
Bumpers	Cincinnati Car Company
Car signal system	Consolidated
Car trimimngs	Bronze oxidized
Conduits and junction boxes	Duraduct
Control	Westinghouse K-63 BR
Couplers	Cincinnati
Curtain fixtures,	Railway Supply & Curtain Company
Curtain material	Pantasote
Destination signs	Hunter illuminated
Door operating mechanism,	National Pneumatic
Wheelguards	H-B
Gears and pinions	Nuttall helical
Hand brakes	Cincinnati
Heater equipment	Consolidated
Headlights	Ohio Brass dash type
Journal boxes	Symington
Lighting arresters	Westinghouse K-3
Motors	Two Westinghouse No. 508-A, inside hung
Enamel	Sherwin-Williams Old Dutch
Registers	International R-10
Sanders	Ohio Brass
Sash fixtures	Bronze oxidized
Seats	Wood slat
Slack adjuster	Gould automatic
Springs	Cincinnati
Trolley retrievers	Earle
Trolley base	Simplex No. 3
Trolley wheels	More-Jones 6-in. No. 2
Trucks	Cincinnati 139-C
Ventilators	Nichols-Lintern, type A
Wheels	Steel, 26 in. diameter
Power-saving device,	Economy 100-amp. meter

Eastern Massachusetts Street Railway, Boston, Mass., has purchased three California type buses with a capacity of twenty-two persons each.

Olean, Bradford & Salamanca Railway, Olean, N. Y., recently placed an order for four new one-man safety cars, two for use in Olean city service and one each at Salamanca and Bradford. One car has already been delivered and has been put in service at Salamanca, according to announcement of District Superintendent A. C. Sloan.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., contemplates the purchase of several new cars of the one-man type to use on its interurban short lines.

Pacific Electric Railway, Los Angeles, Cal., has placed an order for ten more double-deck buses with the Fageol Motors Company in addition to the order mentioned in the ELECTRIC RAILWAY JOURNAL, issue of May 3.

Track and Line

Tri-City Railway, Davenport, Iowa, has started a $45,000 double-track improvement project. Construction will be a continuation of the new improvement work begun last year, carrying the improved right of way from the loop to Warren Street.

Indianapolis Street Railway, Indianapolis, Ind., will spend $185,000 on track repair work. This amount is part of the $500,000 additional revenue estimated to accrue from the new fare.

Seattle, Wash. — Paving work between tracks in several districts of the city, involving a cost of more than $200,000, will be started at once, according to an announcement of the utilities committee of the City Council, following assurances from the Seattle Clearing House Association that warrants issued by the Seattle Municipal Railway Department will be accepted. Bills for the paving work will not fall due until next winter. Among the first jobs to be let will be the Fauntleroy Avenue and the Twenty-second Avenue, N. E., contracts, on both of which the street paving is now under way.

Canadian National Railways, Toronto, Ont., which owns and operates the system at Niagara Falls, Ont., has started work on the rehabilitation of the system in that city. The company will spend about $350,000 in relaying the tracks and roadbeds. It is planned to have the work completed by Sept. 1. Early in 1925 the company intends to construct an entirely new line out Lundy's Lane.

Trade Notes

Truscon Steel Company, Youngstown, Ohio, has announced the appointment of Frederick Maples as manager of the newly instituted steel pole department. He was for a number of years power director of the Long Island section of the Pennsylvania Railroad and was until recently connected with Hubbard & Company, Pittsburgh, manufacturers of pole line construction materials. This new steel pole, which the Truscon Steel Company is soon to put in quantity production, is the result of long experimentation and studied development. It is designed primarily to meet the pressing demand for a steel pole that would be strong, rigid, durable and economical in either light or heavy duty service. The construction of this pole is described elsewhere in this issue.

General Electric Company, Schenectady, N. Y., has awarded a contract to the Turner Construction Company of New York for a six-story reinforced concrete building to be erected at West Philadelphia. This building, in connection with two one-story structures now nearing completion, will be the initial development of a plant to be devoted entirely to the manufacture of switchboard devices.

Economy Fuse & Manufacturing Company, Chicago, Ill., announces the appointment of Morgan P. Ellis as general sales manager. Mr. Ellis has been assistant general sales manager for the past eight years.

Max Riebenack, 3d, is now permanently connected with the Philadelphia branch of the Industrial Works, Bay City, Mich., as district sales engineer, Mr. Riebenack was formerly mechanical and research engineer with the National Aniline Chemical Company and the Industrial Separators Company, Philadelphia.

Trico Fuse Manufacturing Company, Milwaukee, Wis., has recently moved its New York office to larger and better quarters at 154 Nassau Street, R. F. Walsh, district manager in charge. The new office of the company in New York is more centrally located than was the old one, and the change makes it possible for the company to insure still better service for Trico powder-packed, time-limit renewable fuse users in the Greater New York district.

New Advertising Literature

Midwest Air Filters, Inc., New York, N. Y., has issued its new data book entitled "Air Filters for Compressors and Internal Combustion Engines."

Southern Pine Association, New Orleans, La., has issued the ninth revised edition of its manual on standard wood construction.

Wagner Electric Corporation, St. Louis, Mo., has published reprints of a paper read before the joint convention of the Southwestern Geographic Division of the National Electric Light Association entitled "Some Recent Comprehensive Tests on the Fynn-Weichsel Motor"; also a reprint from an article in *Iron and Steel Engineer* called "The Motor that Corrects Power Factor," and a third presented before the electric section of the Wisconsin Utilities Association called "Tests on the Fynn-Weichsel Motor."

Refractories Manufacturers' Association, Pittsburgh, Pa., has issued the fifth edition of its "Book of Brands." In addition to a complete list of manufacturers of fire brick in this country and in Canada, the pamphlet gives an alphabetical list of the brands and trademarks used in the industry.

Taylor-Wharton Iron & Steel Company, Highbridge, N. J., has issued a twenty-page pamphlet entitled "Putting the Right Steel on the Job." The pamphlet is issued primarily to emphasize the lasting quality of Tisco steels.